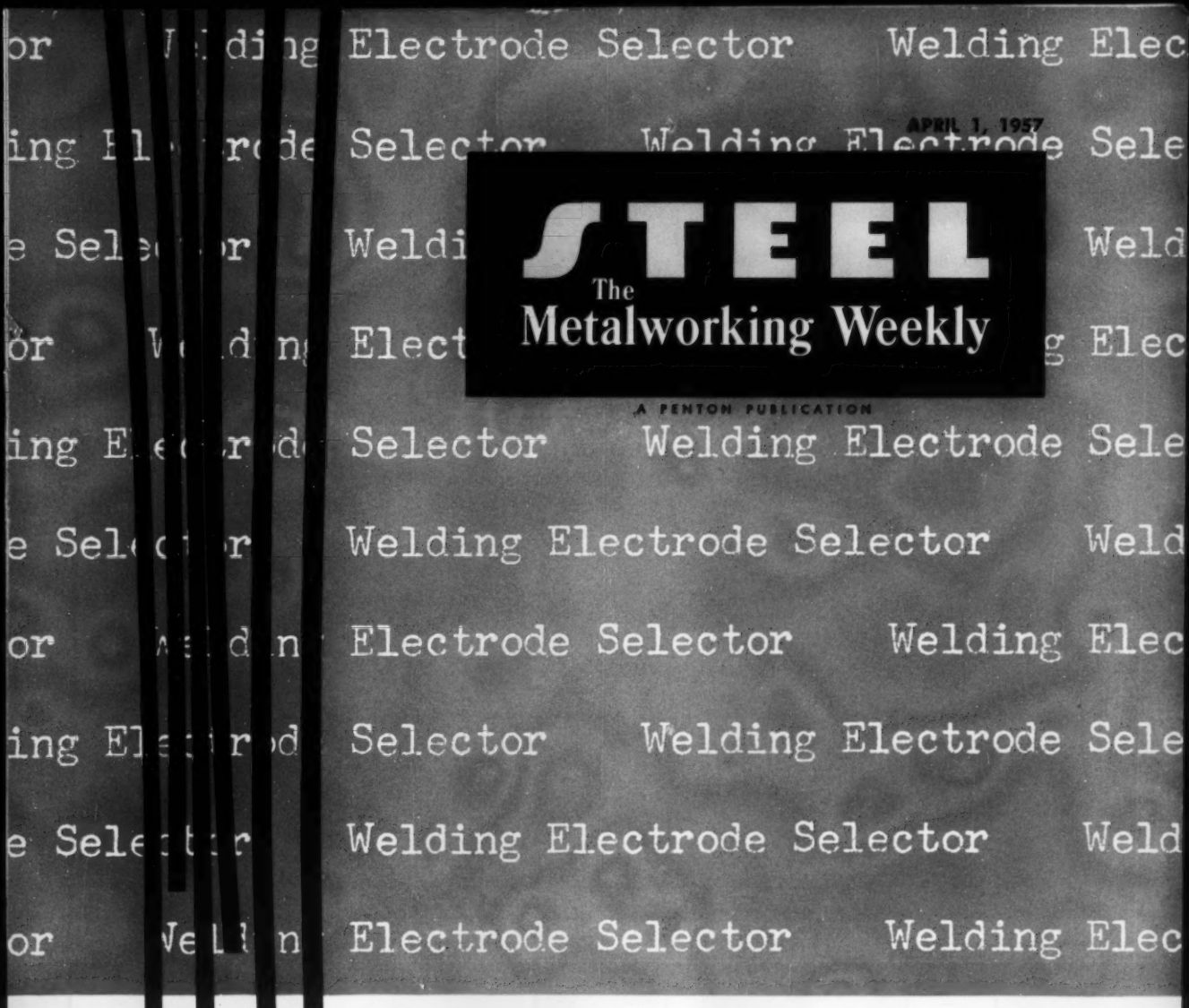
APRIL 1, 1957

STEEL

The Metalworking Weekly

A PENTON PUBLICATION



STAINLESS STEEL

MAGNESIUM

MILD STEEL

LOW ALLOY STEEL

ALUMINUM

COPPER

AUTOMATIC WIRE

Welding Rod Selector

—opposite page 98

- Experts Air Views on Welding's Needs . . . page 92
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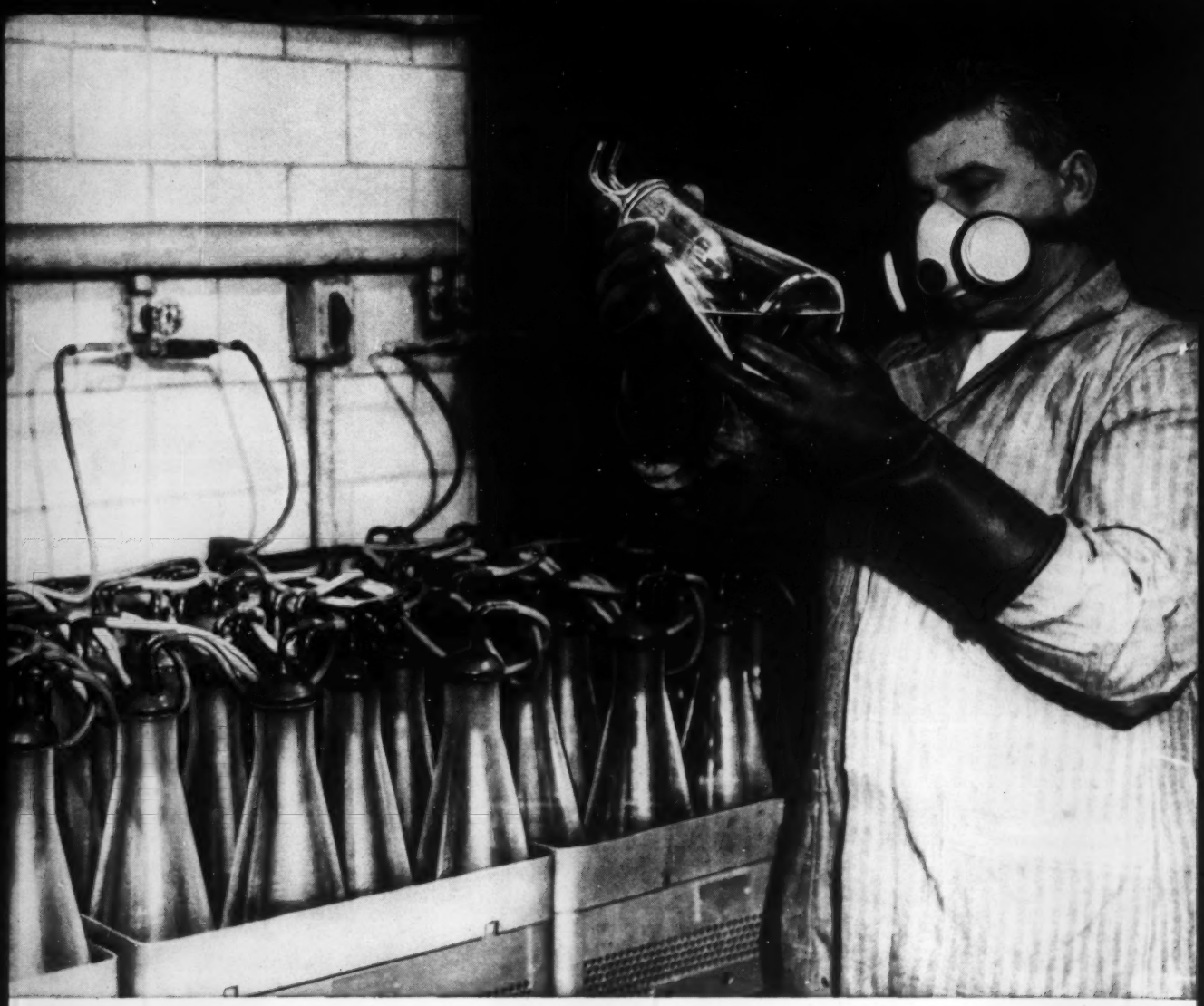


STAINLESS STEELS AND CORROSION RESISTANCE

The best stainless steel tubing for a specific application cannot be identified by surface appearance alone. The answer is found in the grain structure because the corrosion resistance of any given grade of stainless steel depends on heat treatment.

And constant testing is the only way to prove a material's ability to beat the many different types of corrosive attack . . . as B&W men like Mike Landman, who checks corrosion resistance of B&W Stainless Tubing, know. And the entire team of B&W technicians—inspectors, furnace operators, metallurgists, engineers and chemists—know that constant checking is an integral part of the complete production cycle.

Generations of experience are built into every foot of B&W Stainless Tubing. The end result assures long service life—the most corrosion resistant tubes for your particular process industry application. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

TA-7018-G2

Seamless and welded tubular products, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels.

XX

This is the twentieth of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

Flame-Hardening Alloy Steels

When the surface of steel is subjected to direct application of flame and heated above the transformation range, then hardened by quenching, the process is known as flame-hardening. Its primary purpose is to surface-harden without affecting core properties. Jets of flame are played directly on the steel, and hardness penetration can be made to vary considerably. Usually in alloy steels this depth will range from 0.03 to 0.12 in., the actual figure depending upon the method of heating and quenching used.

Unlike carburizing, flame-hardening does not involve the absorption of extraneous elements by the steel. There is no alteration of the chemical composition. To put it simply, the steel must have its own self-hardening characteristics; cannot be dependent upon carbonaceous salt baths, gases, etc.

Flame-hardening is not a substitute for the conventional furnace method. Each has its uses. The particular virtue of flame-hardening is that the flames can be directed to localized areas. The furnace, on the other hand, is generally more economical and feasible when parts produced in large quantities must be hardened all over.

Any type of hardenable steel, alloy or carbon, can be flame-hardened, and there will usually be no scale or pitting. The alloy content is the governing factor when determining the quench. In some cases a rapid quench is required; in others, it can be as slow as air-cooling. Tempering presents no problems, for flame-hardened steel can be tempered as if hardened to the same point by other methods.

A list of typical flame-hardened parts would include such familiar items as gear and sprocket teeth, and certain types of cams and rollers, shoe treads, etc. This list is by no means exhaustive; it could include many other parts that often require a localized hardening treatment, especially for wear-resistance.

When seeking information about flame-hardening methods, please feel free to consult with our technical staff. Bethlehem metallurgists will gladly cooperate, and you can depend upon their suggestions. You can rely on Bethlehem, too, as a source of alloy steels, for Bethlehem makes the complete range of AISI standard grades, as well as special-analysis steels and all carbon grades.

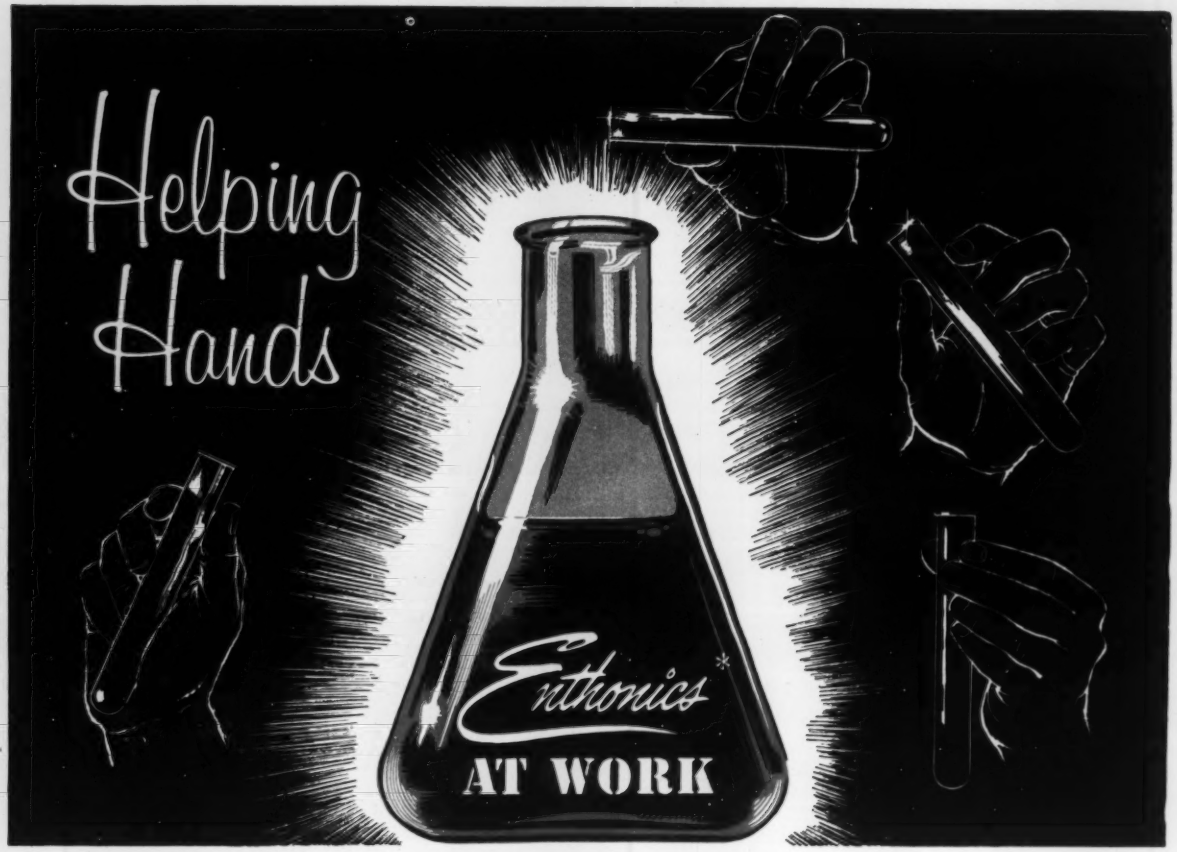
If you would like reprints of this series of advertisements from No. I through No. XVI, please write to us, addressing your request to Publications Dept., Bethlehem Steel Company, Bethlehem, Pa. The first 16 subjects in the series are now available in a handy 32-page booklet, and we shall be glad to send you a free copy.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL



FROM THOUSANDS of TESTS . . .

. . . *come the solutions to your metal finishing problems.*

If *you* are looking for creative chemistry to supply new methods for the improvement of metal finishing, look to the leader – ENTHONE. Write for the answers to these problems, identifying them by number. If your specific problem is not listed, Enthone will gladly help to find the answer.

1. HOW TO BLACKEN copper, brass, zinc, steel and other metals to meet U.S. Government specifications.
2. HOW TO STRIP NICKEL from steel without etching the steel.
3. HOW TO STRIP NICKEL from copper and brass without attacking the part.
4. HOW TO SHED WATER from metals to prevent staining or spotting during drying.
5. HOW TO TRAP FUMES from hot sulfuric acid pickles.
6. HOW TO STRIP SYNTHETIC ENAMELS from aluminum and other metals without attacking the metal.
7. HOW TO CLEAN AND REMOVE RUST AND OXIDES from steel in one operation without acids.
8. HOW TO RINSE AND DRY STEEL WITHOUT RUSTING, using cold or hot water.
9. HOW TO SHORTEN ALKALI CLEANING TIME for steel to 15 seconds.
10. HOW TO REMOVE SOLID DIRT AND OIL from metals.
11. HOW TO STRIP LEAD, TIN or soft solder from copper and brass with no etching.
12. HOW TO PLATE METALS upon aluminum.
13. HOW TO REMOVE EXCESS SILVER SOLDER chemically from silver brazed steel parts.
14. HOW TO MAKE PAINT STICK to brass and zinc.
15. HOW TO SOLVENT-CLEAN parts and assemblies with cold non-hazardous solvent.
16. HOW TO OVERCOME CHROMIC ACID CONTAMINATION in cleaners.
17. HOW TO PREVENT STAINING of chromium plate.
18. HOW TO GIVE ZINC AND CADMIUM high salt spray resistance.
19. HOW TO COLOR ALUMINUM in one operation.
20. HOW TO STRIP METAL COATINGS from zinc die castings.

* *The Scientific Solution of Metal Finishing Problems.*

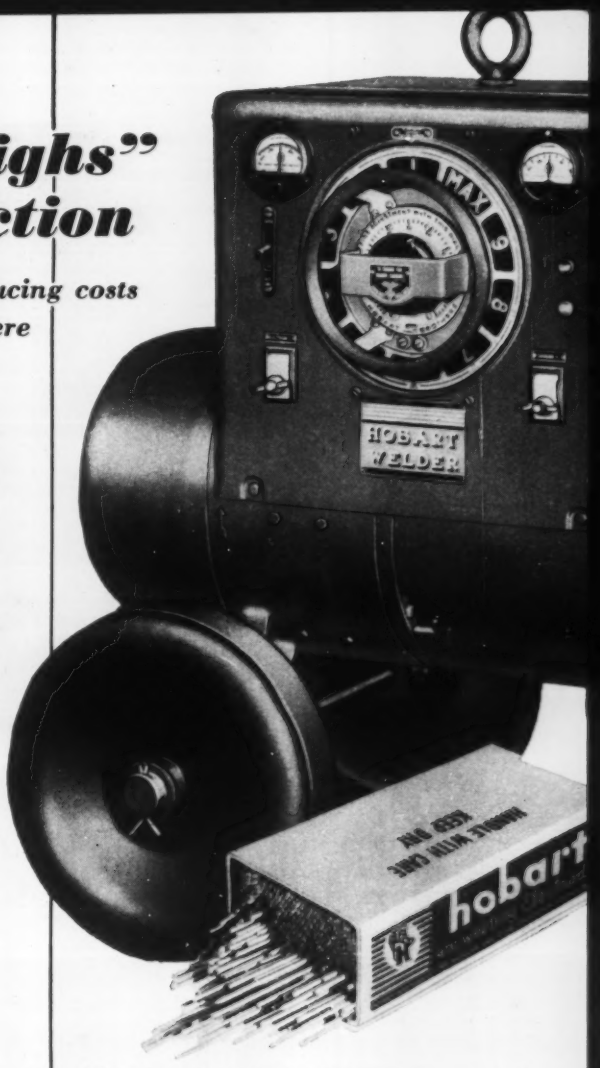
ENTHONE
INCORPORATED

442 ELM STREET, NEW HAVEN 11, CONNECTICUT

Metal Finishing Processes • Electroplating Chemicals

Setting "New Highs" in arc welded production

HOBART arc welders are reducing costs and boosting profits in plants everywhere

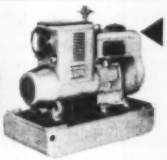


Extra built-in improvements and convenience features of the new Hobart arc welders now offer even greater speeds and an ease of handling that lets you boost production and lower your operating expense. You'll find a big difference when it comes to comparing welding equipment, so important to you in meeting today's rising production costs. Higher efficiency, extra power, extra capacity and the dependability you get in Hobart means better production facilities for cutting your costs. Don't delay any longer, get valuable information without obligation and see how Hobart welders can bring you added savings on your own work.

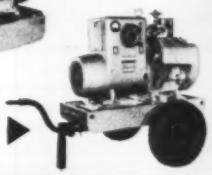
HOBART ELECTRODES are noted for their high quality. There's a Hobart electrode for every type of AC or DC welding. Let us know what type of work you do and we'll see that you get the opportunity of trying the proper electrode for your particular jobs. Extra speed, and uniform weld quality are what you can depend upon with Hobart Electrodes.

Hobart one of the world's largest builders of arc welding equipment

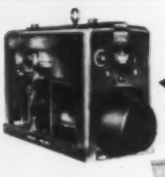
Standard water cooled Gas Engine Drive



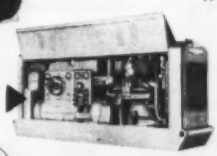
Husky Boy 200 Amp. Air Cooled



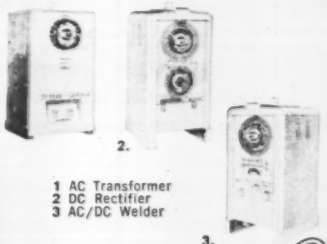
AC Welder AC Power Combination air cooled



250 Amp. "Contractor's Special"



AC Welder AC Power Combination water cooled



1. 2. 3.

1 AC Transformer
2 DC Rectifier
3 AC/DC Welder

HOBART TROY OHIO WELDERS

Get all the facts by simply filling in the coupon, or by writing us, stating any problem you might have on jobs you are contemplating. We'll be glad to send you helpful information.

HOBART BROTHERS COMPANY
Box ST-47, Troy, Ohio, Phone FE-21223

HOBART BROTHERS CO., BOX ST-47, TROY, OHIO

I'd like more information on _____ Amp. Arc Welder

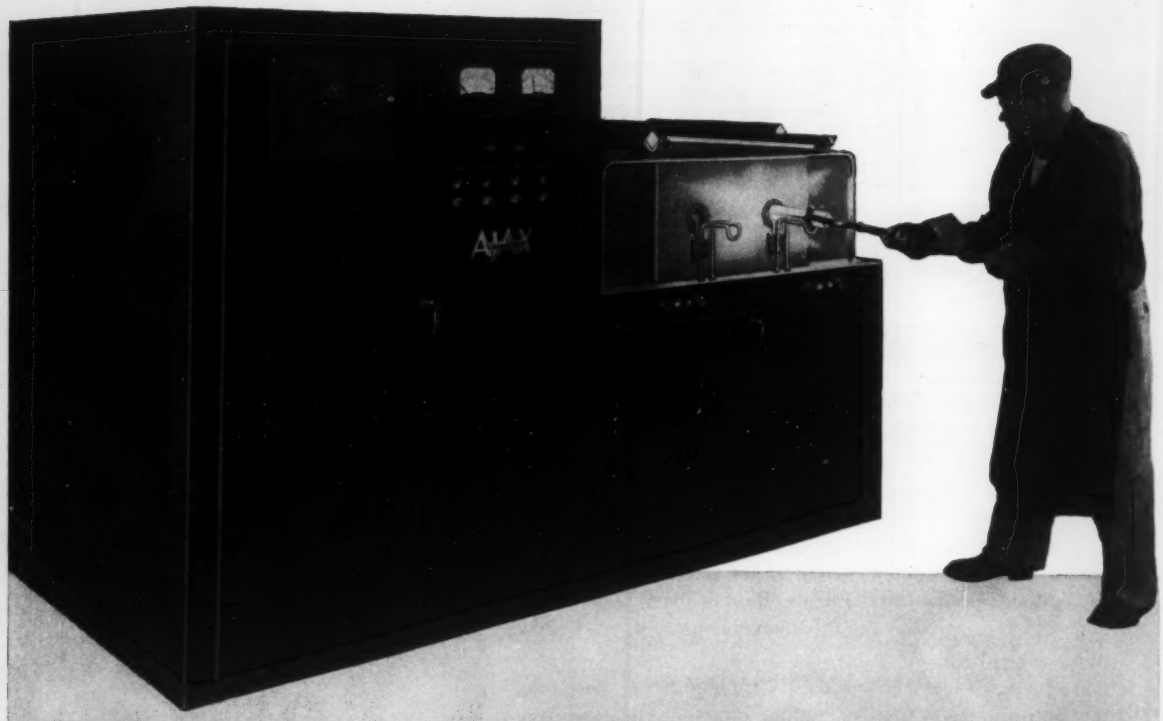
☐ Elec. Motor Drive
☐ Water cooled
☐ AC Transformer
☐ Gas Engine Drive
☐ Gas Engine Drive with Auxiliary Power
☐ DC Rectifier
☐ Air cooled
☐ AC-DC Welder

Name _____

Address _____

City _____ State _____

☐ Send catalog on Arc Welding Electrodes.



Billets automatically hot for forging . . . every twelve seconds

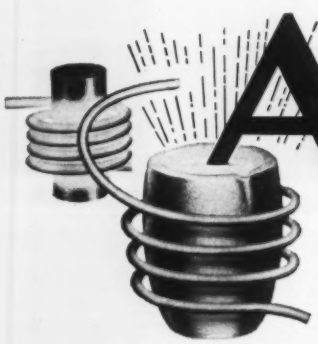
Every twelve seconds this Ajax-Northrup dual heater gives its operator a billet heated to 2250°F. Turning out six hundred parts an hour for automotive use, the unit is typical of the advanced techniques that are revolutionizing this demanding field.

High frequency induction heating equipment has played an important part in bringing forging up-to-date. Quickly heating billets of every size and shape to forging temperature on an exact time base, it's a far cry from the ancient smith's charcoal and bellows or, for that matter, any other heating method. Induction heating means less metal and less heating time . . . negligible scale for longer die life, and fewer rejects . . . and the finished forgings are characterized by finer physicals. Perhaps more important, Ajax induction heating offers flexibility which combined with its other advantages, brings maximum efficiency to numerous forges permitting almost complete mechanization of forge shop practices.

•

For additional details on how Ajax-Northrup induction heating can benefit your forge operations, write Ajax Electrothermic Corporation, Trenton 5, New Jersey, requesting Bulletin 27-B.

Associated Companies: Ajax Electric Company — Ajax Engineering Corporation



AJAX NORTHRUP SINCE 1916

INDUCTION HEATING-MELTING

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Introducing...
METALOK MORTAR

WALSH'S ANSWER TO THE PROBLEM OF JOINT EROSION IN LADLES AND FIREBRICK FURNACE LININGS

Shipped in 100 lb. bags ready for mixing

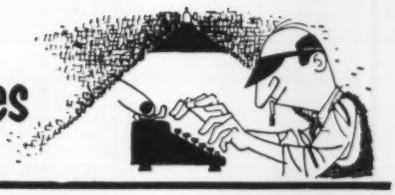
Used in laying up Walsh Ladle brick, Metalok successfully retards penetration of metal and slag... reduces joint erosion to the barest minimum — definitely increases ladle lining life.

For greater satisfaction and improved service in slab, reheat and other metallurgical furnaces, get acquainted with new Metalok. A trial will convince you. Write today for the complete money-saving story.

Specialists in Refractories of High Bulk Density and Low Porosity

WALSH REFRACTORIES CORPORATION
101 FERRY ST. • ST. LOUIS 7, MO.
FOR OVER 60 YEARS MANUFACTURERS OF HIGH GRADE REFRACTORIES

behind the scenes



Weld, Weld, Weld!

As of 8:30 a.m. we didn't know the difference between an arc blow and the sway bracing for a bowstring truss, and obviously a body that poorly informed has no business thumping the tub for some important welding publicity. We placed our problem in the hands of this company's quietly efficient librarian, Elsie Ihlenfeld, and sat back to await results.

In less time than it takes to weld a fine seam, Miss Ihlenfeld had supplied us with several books and pamphlets, all suitably marked and annotated, and now we know that a Russian by the name of Slavianoff patented a metal electrode in England in 1897, eight years after a Detroiter, Charles Coffin, patented a similar process in America. This information will be received coldly in the Kremlin, but here is some that will be received with great interest by the entire metalworking industry: This week's STEEL carries a complete Welding Electrode Selector (following page 98) containing tradenames and firms that make electrodes for welding aluminum, magnesium, copper, mild and low alloy steel and stainless. Two additional articles concern the industry's needs, and the use of welding in maintenance. (See pages 92 and 96.)

All this material is cleverly timed to appear just before the 5th Annual Welding Show & Exposition which will open in the Philadelphia Convention Hall Apr. 8 and run for a week.

Restless Readers

Many of you folks out there in metalworking land shift and move about a great deal, and your copies of STEEL get lost trying to follow. People are moving up, moving down, moving out, moving in, and the post office runs itself ragged trying to place those ever-lovin' copies of STEEL on their desks every Monday morning. Which leads us to the new wrapper you just tore from your new copy: In use for the last several weeks, it carries a handy change-of-address coupon on the back. If you become president of your company, or secretary of state, or are transferred to Tegucigalpa, Honduras, simply fill out the coupon, paste it on a government post card, and drop it in a mailbox. The circulation boys will then see to it that you receive your copy regularly.

Fish and Ships

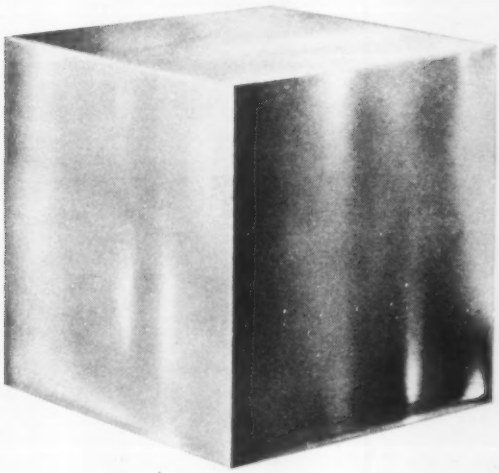
Associate Managing Editor Vance Bell, who has been putting in so much time on the platform of late, last week seized another opportunity to orate. His associate, Associate Managing Editor John Morgan, celebrated a birthday, so Bell and Copy Editor Harry Chandler shopped Woolworth for a suitable present. They acquired a plastic bag containing water and two goldfish, wrapped it as a gift, and right after lunch, Bell assembled the staff and made the presentation. John was deeply impressed; nothing like this had ever happened to him at Yale. "A bag of live goldfish!" he exclaimed. "Just what I've always wanted!"

A hurry-up postal card from Charlsie begs us to take her off the hook. "You listed me as an employee of the Granite City Steel Co.," she writes. "Now my bosses here in the works manager's office of the General Steel Casting Corp., Granite City, Ill., where I have worked for 11 years, are threatening to have me transferred."

Well, Charlsie, we'll make some strong medicine to soften your bosses' hearts; failing that, we'll threaten to have them committed for even thinking of letting you go. And all in the same paragraph we'll add that in a double-twelve domino set the number of bones is 91; the states in which slave holding was still legal in the spring of 1865 were Delaware, Kentucky and Tennessee; and we saved 64 cents. However, we'll put them right back on the line: Two of these ships were sailed around the world: the *Pelican*, the *Golden Hind* and the *Victoria*. Which pair, and who sailed them?

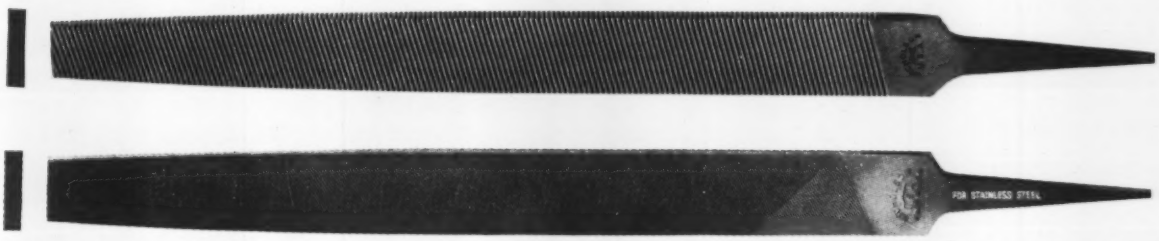
Shrdlu

(Metalworking Outlook—Page 45)



For soft lead...or durable stainless steel...

Nicholson makes a file for every purpose



Whether you work with soft lead or babbitt . . . or whether you have to file rugged stainless steel . . . there's a Nicholson-made file that's been designed specifically for the job at hand.

Not only do we make the world's finest files, but we make them to meet every industrial need—for the softest metals and the hardest . . . for the most delicate instruments and for those big jobs that require rapid but efficient metal removal.

You can select Machinist's files . . . Regular Purpose files and rasps . . . Special Purpose files for aluminum or plastics . . . X.F. (*EX*tra *F*ine) Swiss Pattern files in hundreds of shapes and sizes . . . over *6000* high-quality varieties.

If you work with metal, you can use Nicholson or Black Diamond files

NICHOLSON U.S.A.

NICHOLSON FILE COMPANY, PROVIDENCE, RHODE ISLAND

(In Canada: Nicholson File Company of Canada Ltd., Port Hope, Ontario)

BLACK DIAMOND U.S.A.

NICHOLSON FILES *A FILE FOR EVERY PURPOSE*

IN THE OPERATOR'S HAND —1001 DRILLING SPEEDS

— PLUS THE SMOOTHEST OPERATION IN DRILL HISTORY!

The gearless variable speed drive in the new No. 1 "RPMster" — plus "Buffalo" craftsmanship — have brought a new smoothness and ease to drilling. The shift handle at left places the drive in high or low range, while the dial at right provides infinite variations in either range. They're easily reached, as are all controls on this 88"-high machine. Made in one-to-six spindle pedestal models, the "RPMster" has long-life and accuracy features any shop man will appreciate — all moving parts including the precision spindle machined *after* heat treating to prevent warpage — hand scraped ways — "Buffalo" power feed — strong, rigid, stable base and frame — ample work tables — all parts carefully hand-fitted for permanent accuracy.

But you have to operate an "RPMster" to see why it's literally the finest value in vibration-free, variable-speed drilling available. Write for details on a demonstration at your "Buffalo" machine tool dealer's.

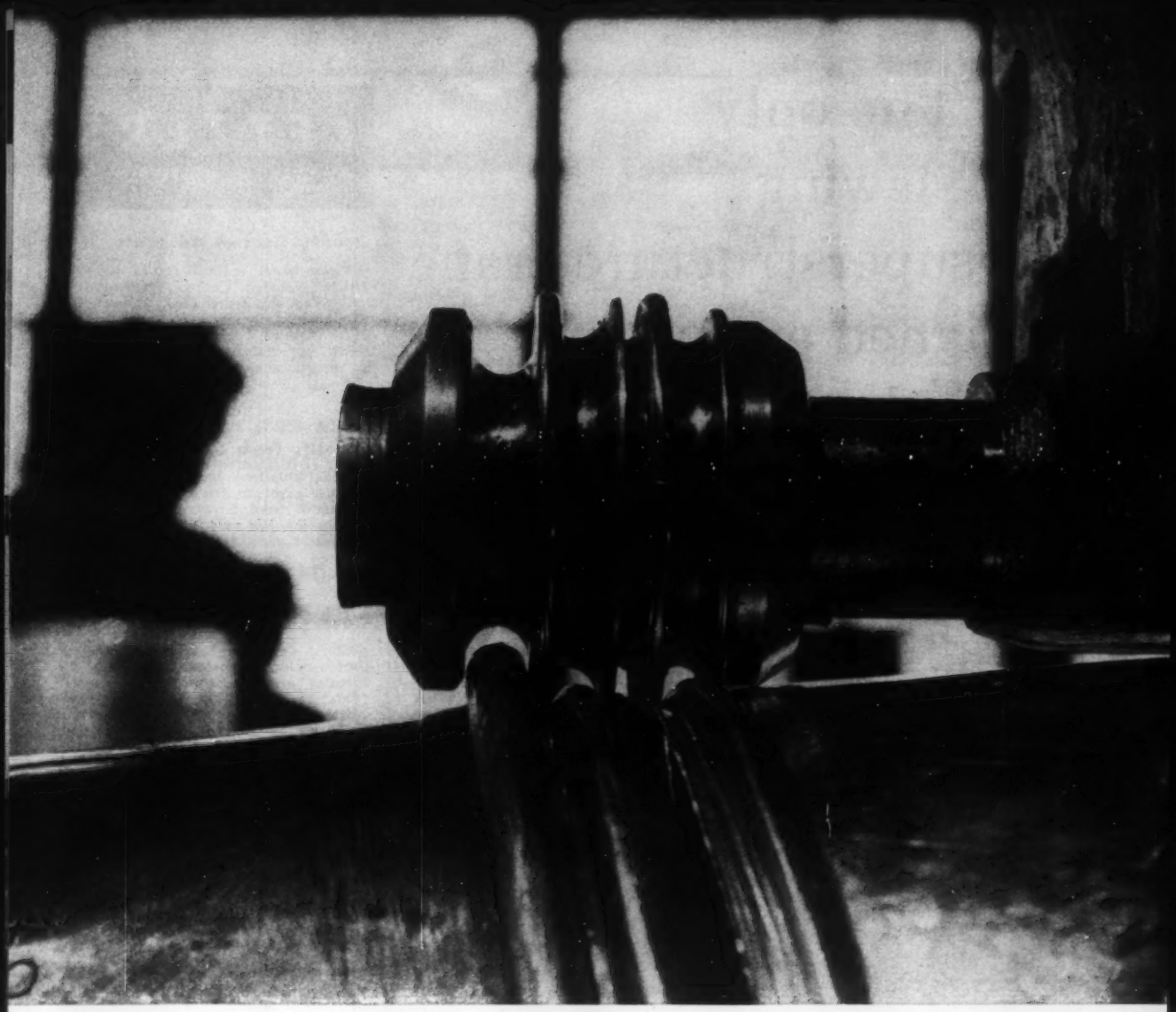
ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

BUFFALO FORGE COMPANY

158 MORTIMER STREET BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING SHEARING BENDING



"NO MATTER HOW TOUGH THE FABRICATING JOB, WEIRKOTE'S® ZINC COATING STAYS PUT!"

Weirkote users know *that* as well as they know their own names. And no wonder! Look how profitably Weirkote zinc-coated steel fits into a fabrication operation.

Weirkote has the tight, continuous-process zinc coating that can stand up to every fabrication procedure, bending, crimping, twisting, lock seaming, the deepest draws, and *stay* tight. No flaking or peeling problems. Far less chance of hidden flaws or only temporary corrosion resistance in the finished product.

In a nutshell, we produce a zinc-coated steel sheet that enables you to give your customers even more built-in value for their dollars. You simplify your production problems and make some important cost savings at the same time.

Why wait? Find out how Weirkote's corrosion resistance, strength and ability to come through severest fabrication stresses unblemished, can help you. For free booklet write to Weirton Steel Company, Dept. B-4, Weirton, West Virginia.

WEIRTON STEEL COMPANY

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

a division of

NATIONAL STEEL CORPORATION

The only full-slewing superstructure crane designed exclusively for industrial materials handling

COLES lifts, lowers and carries with boom in any position throughout a 360° arc.

COLES

CRANES

JOLIET 7, ILLINOIS

WRITE FOR BOOKLET "101 Cost-Cutting Ways"

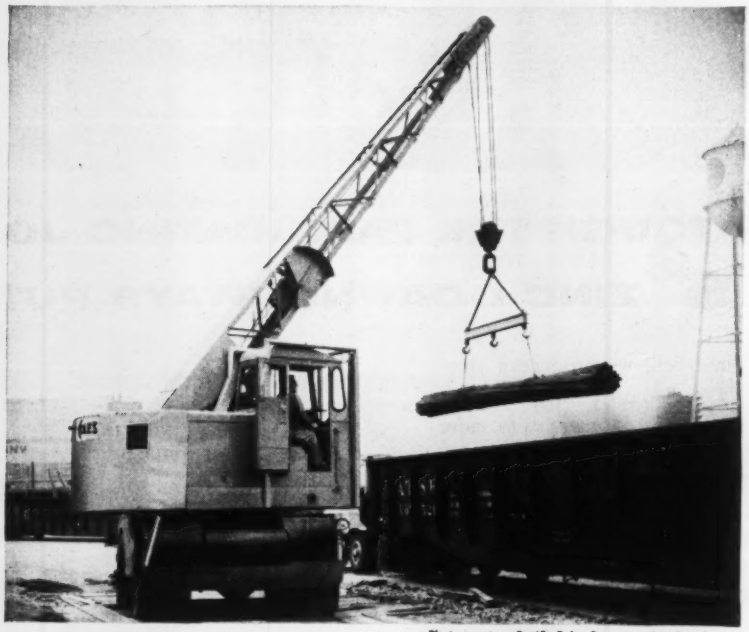


Photo courtesy Pacific Tube Company, Los Angeles

Now, available L.P.G.—diesel or gasoline-electric powered in capacities from 2 to 15 tons. Available on long term lease arrangement, too.

LETTERS
TO THE EDITORS

Quality Control Advocate

Please send several copies of your article, "Quality Control for Automatics" (Feb. 18, page 178). I hope you will have many more such articles because I have been using them to interest our management in setting up an integrated quality control system.

Morris D. Gottesman
Quality Control Engineer
All-Luminum Products Inc.
Philadelphia

Benefits from STEEL

Congratulations on your publication. We use eight to ten magazines, and I get more from STEEL than any other publication. We pass the magazine along to several department heads.

W. E. Walpole
President and General Manager
Walbro Corp.
Cass City, Mich.

Covers Subject Well

Could we please have three copies of the articles, "Needed: Materials for Missiles" and "Specs for Missile Metals" (Feb. 25, page 86)? They were well written—certainly cover the subject.

Ralph Rathyen
Manager
Crucible & Refractories Division
Joseph Dixon Crucible Co.
Jersey City, N. J.

Metals for Speedy Aircraft

The article, "Exploring the Thermal Barrier" (Mar. 11, page 154), is interesting and well done. Please forward two reprints of this timely report.

R. A. Wenneker
Chief Materials and Processes Engineer
McDonnell Aircraft Corp.
St. Louis

Article Is Instructive

Thank you for the reprint of the article, "Primer for In-Plant Training" (Jan. 28, page 68). I found it instructive. I am looking forward to reading similar articles in your publication.

F. Wicks
Training Supervisor
Northwest Industries Ltd.
Edmonton, Alta.

Hardenable Stainless Steel

In the article, "Cast Alloy Resists Corrosion" (Jan. 28, page 95), you state that the new CD-4MCu alloy has mechanical properties comparable to 18-8 stainless.

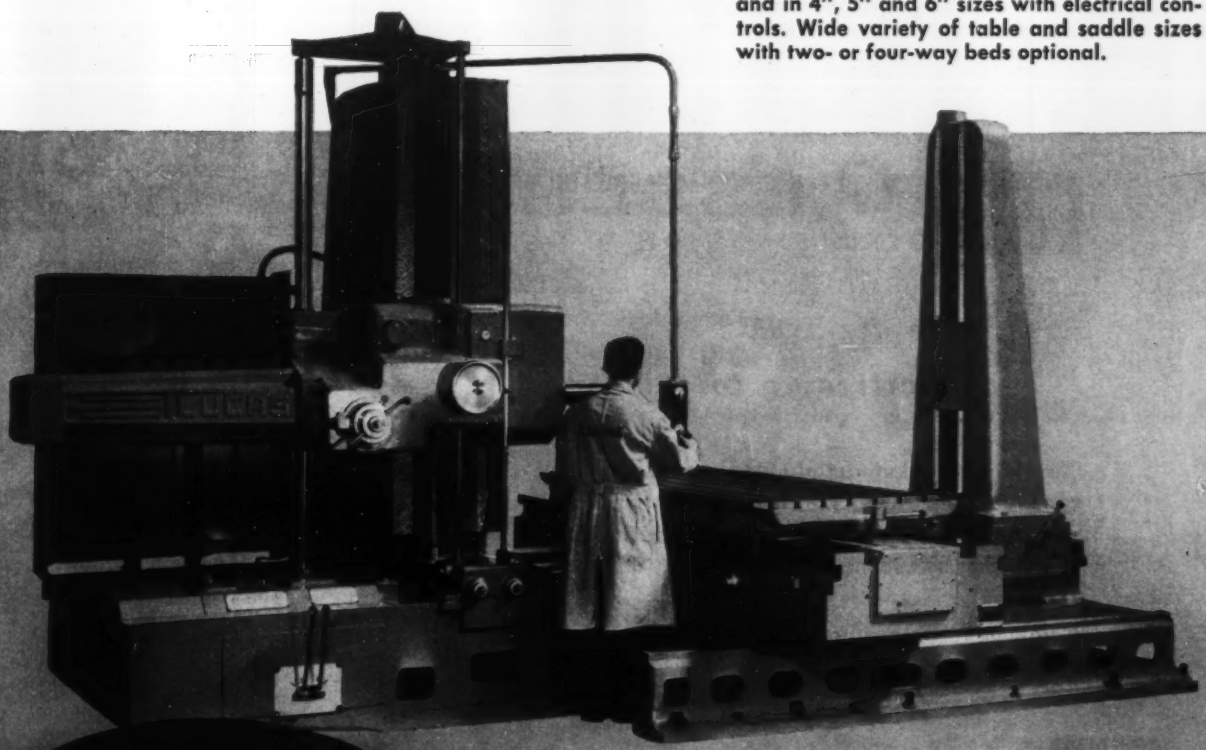
The truth is that the cast alloy has far better mechanical properties than the common 18-8 stainless steels, while retaining corrosion resistance comparable to 18-8 stainless—an achievement unattained by other hardenable grades. This alloy can be used in a wide

(Please turn to page 12)

there's always work for a Lucas

Extreme accuracy, feather-touch pendant control, automatic power positioning for repetitive work make a Lucas the most useful machine in any shop. There's a model and size for *your* horizontal boring, drilling and milling operations. Lucas Machine Division, The New Britain Machine Company, 12302 Kirby Avenue, Cleveland 8, Ohio.

A complete range of models, built in 3", 4" and 5" spindle sizes with mechanical controls and in 4", 5" and 6" sizes with electrical controls. Wide variety of table and saddle sizes with two- or four-way beds optional.



LUCAS
OF
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A DIVISION OF THE NEW BRITAIN MACHINE COMPANY

Other New Britain Machine Tool Divisions

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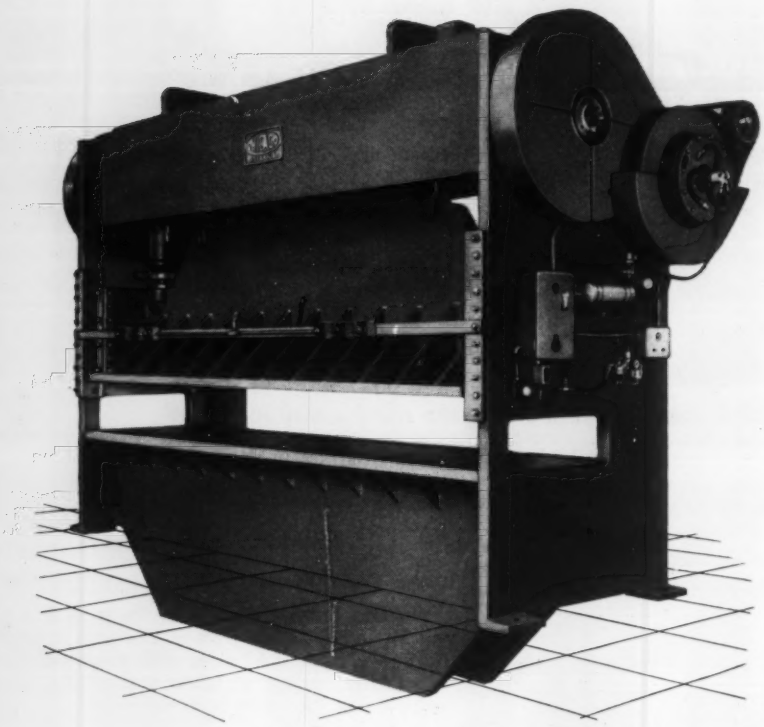
New Britain, Connecticut

Hoern & Dilts Division
Saginaw, Michigan



CHICAGO DREIS & KRUMP

PRESSES
STRAIGHT-SIDE TYPE

large die area
capacities up to 400 tons

This is a typical model of CHICAGO straight-side-type presses used for multiple punching, notching, and trimming operations. This press with a die area of 48 inches by 198 inches has a capacity of 200 tons.

Complete recommendations for any job on request.

8674

CHICAGO DREIS & KRUMP

Press Brakes • Straight-Side-Type Presses • Press Brake Dies
Hand and Power Bending Brakes • Special Metal-Forming Machines

DREIS & KRUMP
MANUFACTURING CO.
7458 South Loomis Boulevard, Chicago 36, Illinois

LETTERS

(Concluded from page 10)

variety of corrosive media, where exceptionally high mechanical strengths are required.

E. A. Schoefer
Executive Vice President
Alloy Casting Institute
Mineola, N. Y.

Planning Rests on Statistics

Thank you for forwarding two copies of your booklet, "Facts and Figures of the Metalworking Industry" (Jan. 7 insert).

It was of tremendous importance to us as fabricators for the electrical and electronic industries. Because we are dependent upon such information (as you have prepared) for our forecast, you can visualize its importance in our planning.

E. H. Tegtmeier
Vice President of Sales
Tempel Mfg. Co.
Chicago

Exciting and Educational

I would be pleased to receive two copies of your article, "Machines That Obey Orders" (Jan. 21, page 68). It is exciting and educational.

A. C. Haley
Superintendent of Tooling
Meter Plant
Westinghouse Electric Corp.
Raleigh, N. C.

Emphasizes Important Points

Your article, "Management Development—The Care and Feeding of the Junior Executive" (Feb. 11, page 93), is the best thing I have seen on this subject in a long time.

You certainly must have talked with a lot of "juniors" like myself because you have put your finger on many of the things which I and many others believe to be important.

I would like three copies of this article for distribution.

A. L. Trumpler
Promotion Manager
Harper Electric Furnace Corp.
Buffalo

This article is enlightening and enjoyable. I would like three copies.

Victor C. Phillips
C. F. Braun & Co.
Alhambra, Calif.

Short-Time Aluminum Welding

We would like 30 tear sheets of the article, "New Way To Weld Aluminum" (Feb. 25, page 108). We feel you did an excellent job.

Lloyd A. Cook
President
Ravens-Metal Products Inc.
Ravenswood, W. Va.

Machine Casts Various Shapes

We have noted the article, "Automatic Casting" (Feb. 4, page 110), that tells of a new machine built by Lobeck Casting Processes Inc., New York. We would appreciate the address of this company.

Helen Filinovich
Division Lead Co.
Summit, Ill.

• *It is located at 114 E. 32nd St., New York 16, New York.*

Your SAVINGS start on the Drafting Board when you plan to use

LYNCHBURG FOUNDRY

SHELL CASTINGS

GREATER UNIFORMITY—A must with today's high-speed automatic machine tools—it means less fixturing time, lower machine shop losses, and less balancing when required.

LESS MACHINING—Close control of dimensions means less machining, faster machining methods, or in some instances elimination of machining altogether.

MADE FOR LIGHT TRAVEL—Less machine stock means reduced weight—lowering transportation costs both in shipment and within the factory.

SUPERIOR SURFACE FINISH—Shell castings have "eye appeal"—their surface dresses up any finished product. Further, a smooth finish reduces wear on machine tools.

AND ONLY 1/16" STOCK IN THE GROOVES, TOO?
YES, AND THIS REDUCES THE WEIGHT FROM 64 TO 46 LBS.
GRAY IRON AND DUCTILE IRON—
Heat treated or as cast
LFC

No matter how huge the finished product, the importance of careful planning for each component part cannot be overemphasized. Savings really did begin at the drafting board stage when heavy road machinery designers specified Lynchburg Foundry shell molding for the sheave pictured above. They reasoned that if certain machining operations could be reduced or eliminated, considerable savings would result.

The use of shell molding in this application meant that finish stock was held to 1/16 inch compared to 1/8 inch or more when other casting methods were used. Further, shell mold cores were used to form the V-belt grooves, thus reducing the machining substantially. An added attraction of shell molding in this case was the fact that the reduced machine stock meant less weight and consequently lower shipping costs from foundry to factory.

Why don't you plan, from the very beginning, to use Lynchburg Foundry shell castings? Savings will be evident from the drafting board, to the assembly line, to the retailer's showroom, and most important, to the man who buys and uses your product.

LYNCHBURG FOUNDRY CO., Lynchburg, Virginia

DISTRICT SALES OFFICES:

50 BROAD ST., NEW YORK, N.Y. • 122 SOUTH MICHIGAN AVE., CHICAGO, ILL. • 1783 E. 11TH ST., CLEVELAND, OHIO

No matter how many cutting tools You can get the "whole package"

MORSE-FRANCHISED

Take a close look at this set-up and you'll see these 7 tools: Center drill, cobalt drill, carbide core drill, facing and turning tool, roughing reamer, finishing reamer, tap.

One man supplied all seven tools. And he, of course, is your Morse-Franchised Distributor . . . your only source for all the varied requirements of a complete tooling job like this. And the job is protected . . . *results insured* . . . by Morse Quality in every single tool. So call in this "1-man team" today . . . he makes Morse Tooling pay *all ways.*

MORSE TWIST DRILL & MACHINE CO., NEW BEDFORD, MASS.
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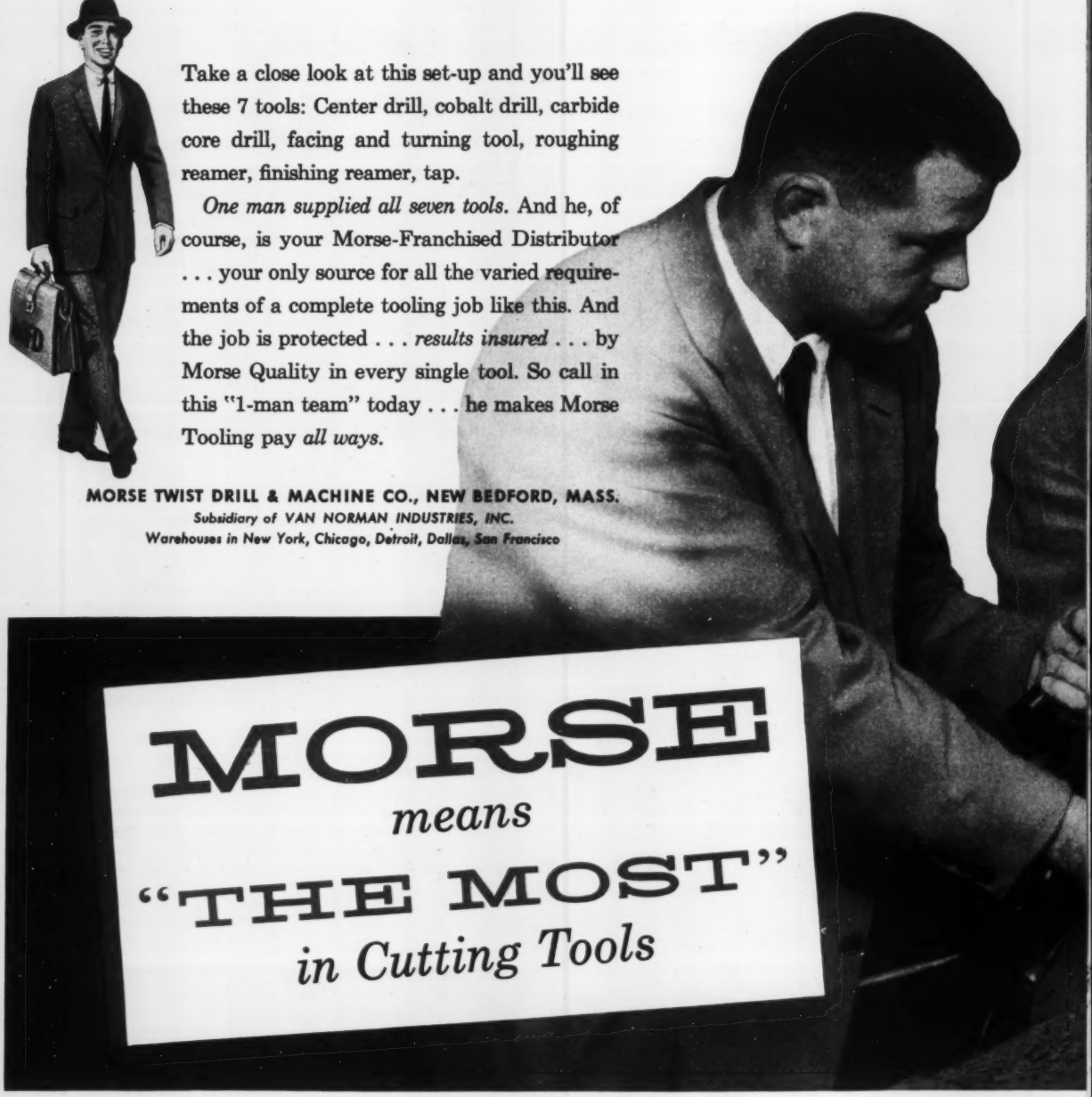

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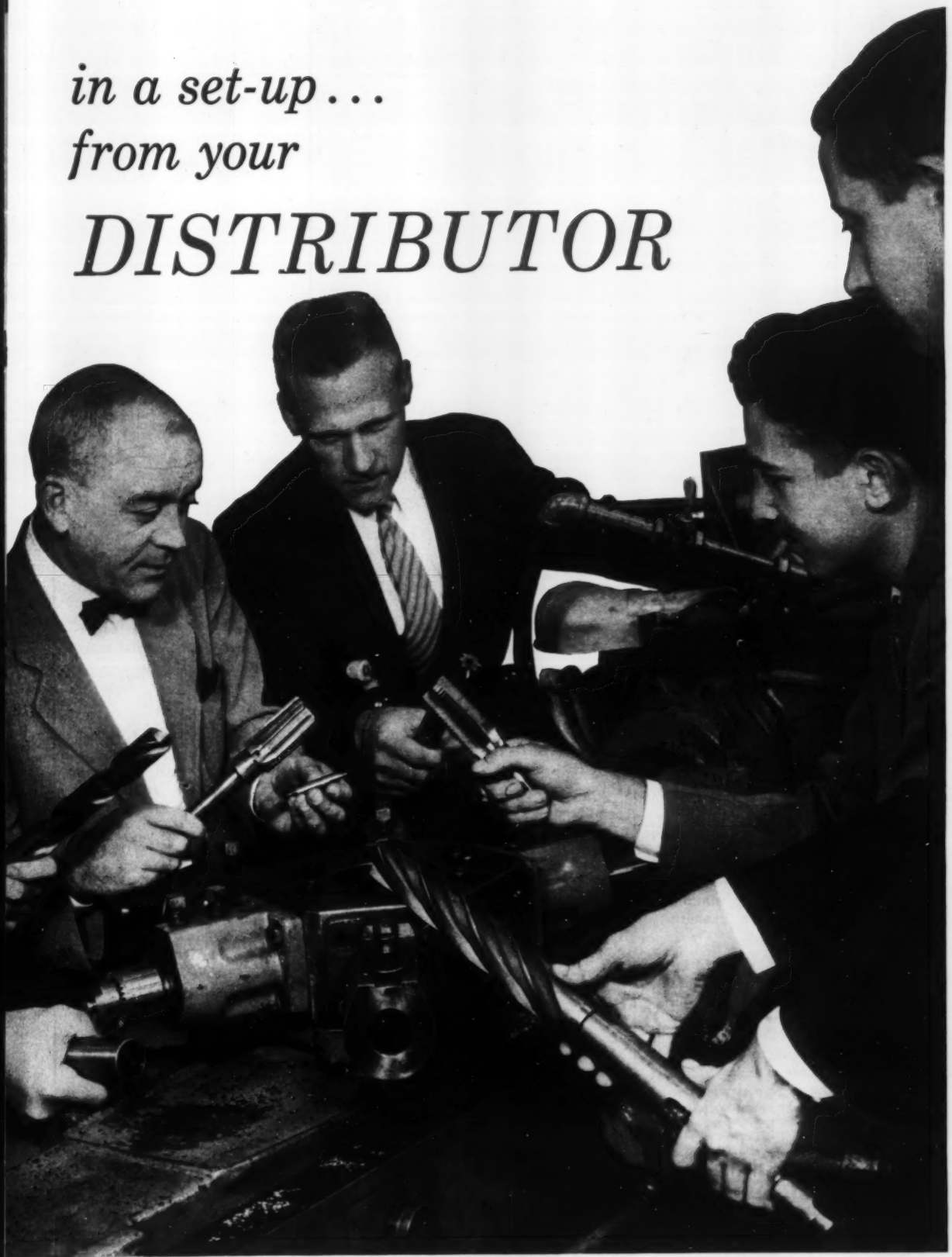

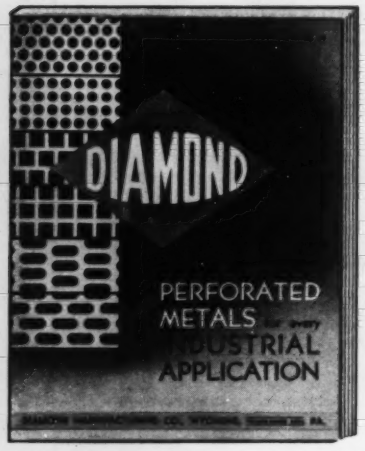

This 32-Page Catalog Points the Way to Improved Design of Many Modern Products

Diamond Perforated Metal is an important factor in the design and construction of more products that enter into every-day life than most people realize.

In Space Heaters, for example, in Air Conditioners, Television Sets, Diffused Lighting Fixtures, the Ornamental Enclosures which conceal your radiators, the Spinner Basket of your washing machine, the Screens which help prepare the coal you burn and the food you eat.

Industrial applications cover an even wider range—from Machinery Guards and Sound Control Equipment to Stainless Steel Screens for oil refineries and synthetic rubber plants. New applications are developing every day as we keep in step with the requirements of engineers, chemists and industrial designers.

Catalog 39 shows many modern applications; gives all the illustrations and working data you need to plan ahead. Write, today, for a free copy and tell us about ANY requirement for perforated metal. We are equipped to fabricate complete parts, if desired, and our engineers welcome opportunities to make money-saving suggestions.

DIAMOND MANUFACTURING CO.
Box 32 WYOMING PENNA.

West Coast Plant, Diamond Perforated Metals Co.
17915 So. Figueroa St., Gardena, California
Los Angeles Area

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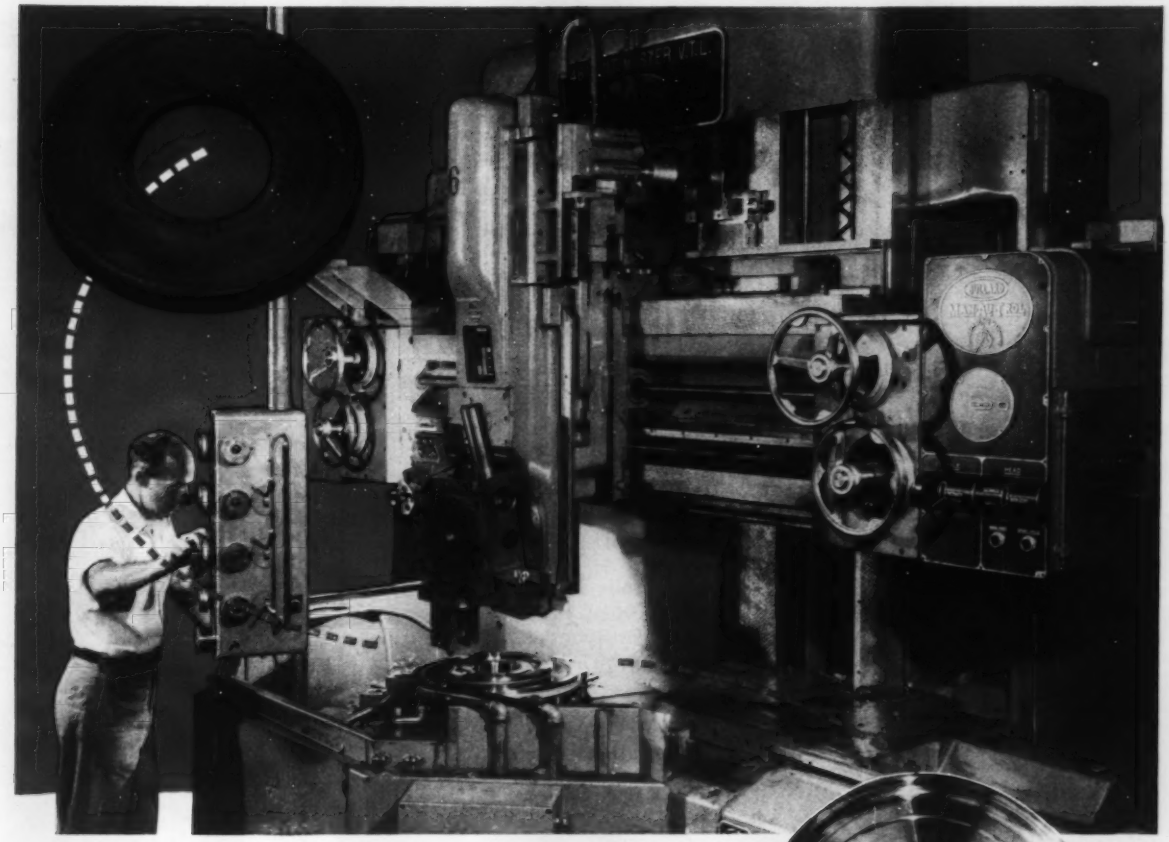


"To produce quality parts in quantity . . .

Nothing beats Man·Au·Trol"

This statement by Mr. W. Mason Williams, Manufacturing Manager of the Jet Division, Thompson Products Inc., Cleveland, Ohio, is based on ten years of experience with Man-Au-Trol.

"If it hadn't been for Man-Au-Trol" Mr. Williams continues, "we would still be turning out aircraft engine components on manually-operated machines. Man-Au-Trol, particularly when tooled with better cutting tools, has enabled us to turn out at least *five times as many compressor disc and turbine discs per shift* as we produced on hand-operated equipment."

BULLARD

You, too, can apply to your machining problems the many advantages offered by Man-Au-Trol, Model 75 — just call your nearest Bullard Sales Office, Distributor or write for catalog to

THE BULLARD COMPANY

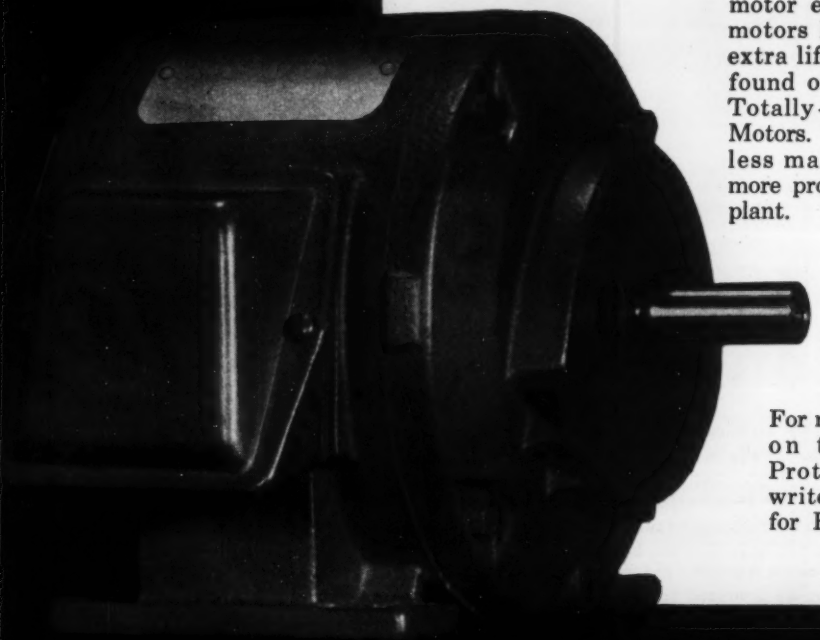
BRIDGEPORT 9, CONNECTICUT

TOTALLY-PROTECTED MOTOR

When we speak of Totally-Protected, we mean superior frame design with rigidity for heavy load conditions. We mean Metermatic bearing lubrication, acid and oil-proof insulation system, and motor leads, labeled and sealed in neoprene.

Totally-Protected means all this and more, but most of all it means a new concept of motor design and construction.

This Totally-Protected concept brings you a new motor efficiency. These motors have a built-in extra life—an extra life found only in Reliance Totally-Protected A-c. Motors. You profit from less maintenance and more production in your plant.



For more information on this Totally-Protected concept, write to Dept. 43A for Bulletin B-2401.

(B-1543)

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AND ENGINEERING COMPANY

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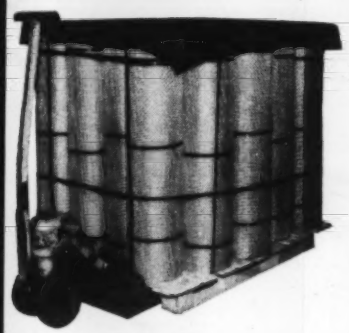

How **REYNOLDS** packs new savings into wire cloth shipments

• Palletized packaging for wire cloth, successfully developed by the Reynolds Wire Division of National-Standard, is now saving customers plenty of time and dollars.

Note in the photographs how rolls of slit and full width material are both mounted on non-returnable pallets. Advantages and savings accrue all along the way.

For example, there's far less chance of damage in shipment. And think how much faster, easier, these unit loads can be handled on arrival . . . in and out of storage . . . and right to production operations.

So chalk up another extra for Reynolds' service . . . and find out what this new packaging method can mean to you! Find out, too, what Reynolds means by quality control and uniformity in wire cloth manufacture. It pays.

NATIONAL NS NATIONAL-STANDARD Company **STANDARD**

DIVISIONS: NATIONAL-STANDARD, Niles, Mich.; *fine wire, stainless, music spring and plated wires* • WORCESTER WIRE WORKS, Worcester, Mass.; *high and low carbon specialty wires*
WAGNER LITHO MACHINERY, Secaucus, N. J.; *metal decorating equipment* • ATHENIA STEEL, Clifton, N. J.; *flat, high carbon spring steels* • REYNOLDS WIRE, Dixon, Ill.; *industrial wire cloth*

broken sardines and cut fingers

You avoid broken sardines and cut fingers when you open stubborn cans with their handy keys—keys which are often made from special uniformly tempered, low carbon CF&I-Wickwire Can Key Wire.

Chances are you don't need wire to make can keys. But *you may need one or more of the nearly 100 different categories of specialty wire for which CF&I-Wickwire is famous.* Let us show you how we can meet your most rigid chemical and physical specifications on high and low carbon wire in all sizes, shapes, tempers, finishes and grades.

Check This List!

FOR THE WIRE YOU REQUIRE, SEE CF&I-WICKWIRE.

FLAT AND SHAPED WIRES
Armor Wire
Bobby Pin Wire
Bookbinder Wire
Brush Wire
Casing Wire
Cotter Pin Wire
Curtain Spring Wire
Die Spring Wire
Gutter Broom Wire
Lock Spring Steel
Rake Tine Steel
Regulator Spring Wire
Snake Fishing Steel
Stapling Wire for Preformed Staples (Flat)

LOW CARBON FINE AND SPECIALTY WIRE
Bee Wire
Bonnet Wire
Bookbinder Wire
Broom Wire
Clip Wire
Dent Spacer Wire
Drapery Pin Wire
Florist Wire
Fuse Wire
Glass Netting Wire
Hairpin Wire
Hook and Eye Wire
Mattress Wire
Picture Cord Wire
Picker Tooth Wire
Pin Ticket Wire
Pin Wire
Ring Traveller Wire
Spiral Binding Wire
Stapling Wire
Stapling Wire for Preformed Staples
Stone Wire
Weaving Wire
Weaving Wire for Fly Screen Cloth
Wissco Iron Wire

HIGH CARBON FINE AND SPECIALTY WIRE
Aircraft Cord Wire
Armor Wire
Belt Hook Wire
Bobbin Ring Wire
Brush Wire (Tempered and Untempered)
Brush Wire (High Strain)
Chrome Vanadium Spring Wire
Core Wire (Aluminum Cable Steel Reinforced)
Curtain Spring Wire
Flexible Shaft Wire
"Gamma" Spring Wire (Upholstery Spring Wire)
Zig Zag Wire
No-Sag Wire
Hat Wire
Heddle Wire
Hose Reinforcement Wire
Hose Wire, Mechanical
Hose Wire, Vacuum and Defroster
Rope Wire
Signal Corps Wire
Spoke Wire
Hard Drawn Spring Wire
Oil Tempered Wire
Spheroidized or Annealed Spring Wire
Tire Bead Wire
Valve Spring Wire

MANUFACTURERS LOW CARBON COARSE WIRE
Bag Tie Wire
Basket Handle Wire
Box Binding Wire
Brush Handle Wire
"Cal-Tie" Wire
Can Key Wire
Case Hardened Ball Wire
Chain Wire
Clamp Wire
Clothes Pin Wire
Concrete Wall Reinforcement Wire
Garment Hanger Wire
Hay Baling Wire (Coiled)
Lingo Wire
Lintel Wire
Loop Wire
Merchant Quality Wire
Pail Bail Wire
Rivet Wire
Stapling Wire
Strand Wire
Tying Wire
Welding Wire
Wissco Iron Wire
Industrial Quality Wire
Cold Rolling Quality Wire
Heading, Forging or Roll Threading Quality Wire
Medium High Carbon Wire

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

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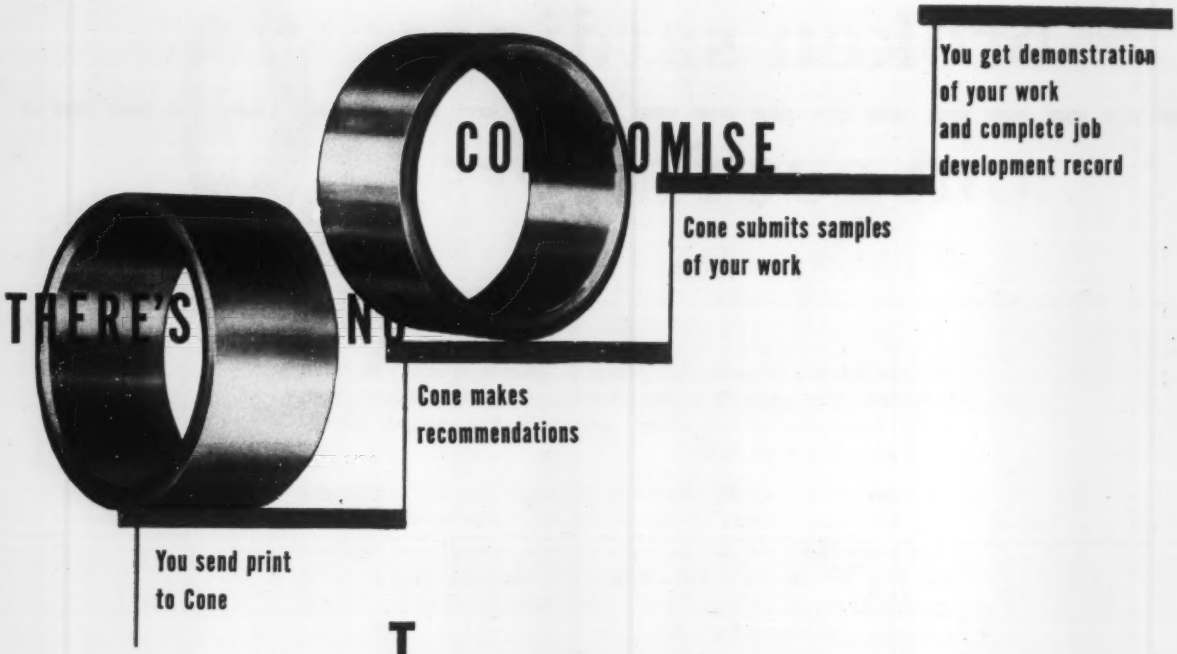

THERE'S NO COMPROMISE
You get demonstration of your work and complete job development record
Cone submits samples of your work
Cone makes recommendations
You send print to Cone

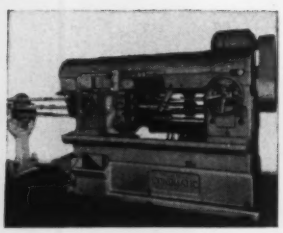
There is no adequate compromise with efficient production practices, if you are in business for a profit.

But you don't always know just how competitively efficient your equipment is. Case histories of what the other fellow is doing are sometimes garbled. At least the poor ones are not advertised. And conditions vary in all plants. Sometimes you have reason to be more concerned with what you don't want in new equipment than with what you do want. Cone believes too much is at stake for a machine to go into a line unequipped for the job, with either carbide or hss tools.

The Conomatic Carbide Development treats each job individually from standpoint of work, machine, tools, and operating personnel.

DATA FOR COMPARISON

Part.....Bushing	Length.....⅝"
Machine.....1⅝" Conomatic	Hole Dia.....1¼"
Tools.....100% Carbide Tipped	RPM.....825
Material.....8620	Time.....14.8 Secs.
Stock Size.....1⅝"	



Conomatic

For particulars send for "Four Steps With Cone"

CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U. S. A.

CALENDAR
OF MEETINGS

Apr. 1-3, International Acetylene Association: Annual meeting, Nicollet hotel, Minneapolis. Association's address: 205 E. 42nd St., New York 17, N. Y. Secretary: H. F. Reinhard.

Apr. 2-4, American Hot Dip Galvanizers Association Inc.: Annual meeting, Empress hotel, Miami Beach, Fla. Association's address: 1806 First National Bank Bldg., Pittsburgh 22, Pa. Secretary: Stuart J. Swensson.

Apr. 2-5, Society of Automotive Engineers: Aeronautic meeting and production forum and aircraft engineering display, Hotel Commodore, New York. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Apr. 7-10, National Screw Machine Products Association: Annual meeting, Shoreham hotel, Washington. Association's address: 2860 E. 130th St., Cleveland 20, O. Executive vice president: Orrin B. Werntz.

Apr. 8-10, American Institute of Mining, Metallurgical & Petroleum Engineers: Open hearth and blast furnace conference, William Penn hotel, Pittsburgh. Institute's address: 29 W. 39th St., New York 18, N. Y. Secretary: E. O. Kirkendall.

Apr. 8-10, American Society of Mechanical Engineers: Spring meeting, Dinkler-Tutwiler hotel, Birmingham. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Apr. 8-10, Gas Appliance Manufacturers Association: Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Association's address: 60 E. 42nd St., New York 17, N. Y. Secretary: Harold Massey.

Apr. 8-10, Metal Treating Institute: Spring meeting, Boca Raton hotel and club, Boca Raton, Fla. Institute's address: 271 North Ave., New Rochelle, N. Y. Executive secretary: C. E. Herington.

Apr. 8-12, American Welding Society: Spring technical, national meeting and welding show, Sheraton and Bellevue-Stratford hotels and Convention Hall, Philadelphia. Society's address: 33 W. 39th St., New York 18, N. Y. National secretary: J. G. Magrath.

Apr. 9, Material Handling Institute: Spring membership and directors' meeting, Edgewater Beach hotel, Chicago. Institute's address: One Gateway Center, Pittsburgh 22, Pa. Managing director: R. Kennedy Hanson.

Apr. 10-11, Bituminous Coal Research Inc.: Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Association's address: 803 Southern Bldg., Washington 5, D. C. Secretary: C. A. Reed.

Apr. 10-11, Malleable Founders' Society: Market development conference, Edgewater Beach hotel, Chicago. Society's address: 1800 Union Commerce Bldg., Cleveland 14, O. Managing director: Lowell D. Ryan.

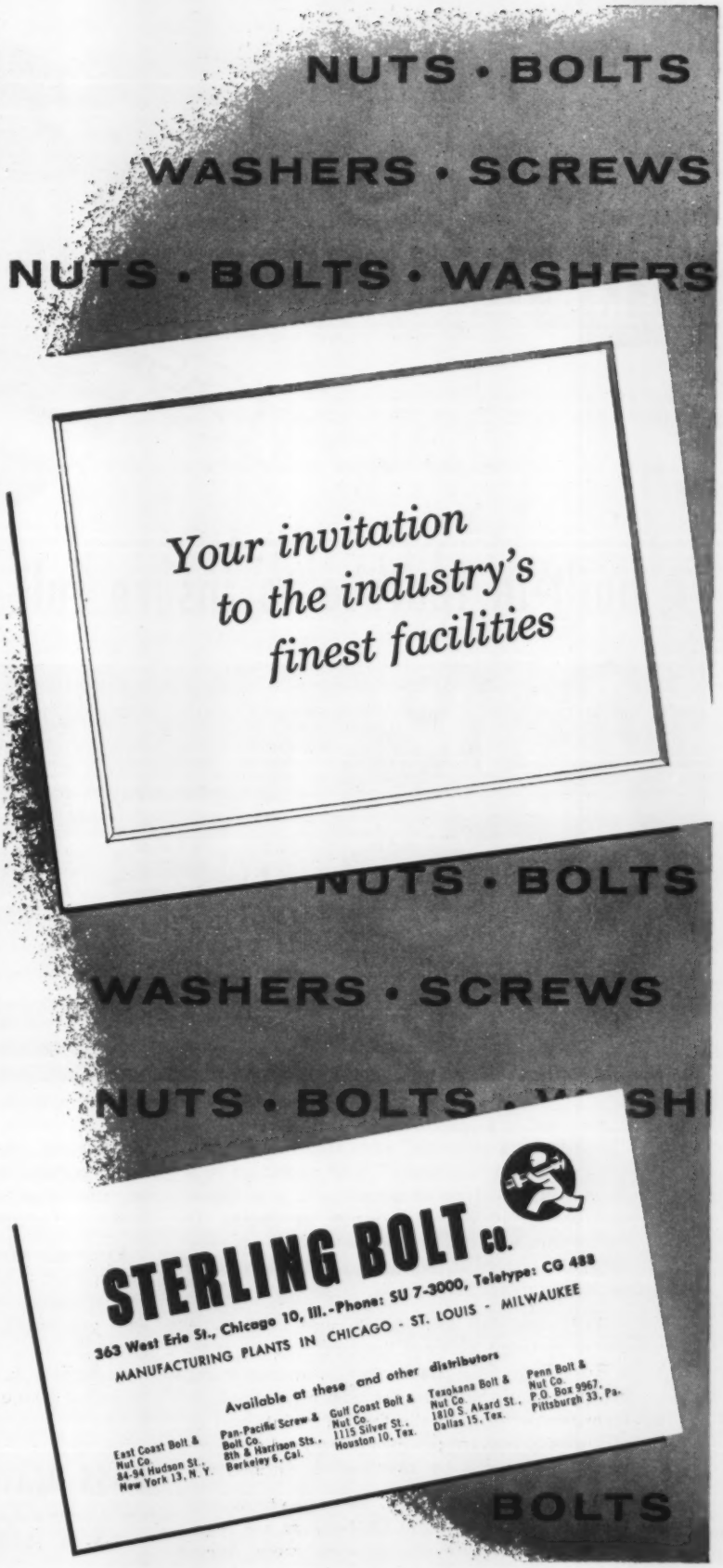
Apr. 15-17, American Society of Lubrication Engineers: Annual meeting and exhibit, Sheraton-Cadillac hotel, Detroit. Society's address: 84 E. Randolph St., Chicago 1, Ill. Administrative secretary: William P. Youngclaus Jr.

Apr. 15-17, Building Research Institute: Annual meeting, Drake hotel, Chicago. Institute's address: 2101 Constitution Ave., Washington 25, D. C. Executive director: W. H. Scheick.

Apr. 23-24, American Institute of Electrical Engineers: Biennial conference on electric heating, Commodore Perry hotel, Toledo, O. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

Apr. 23-25, Grinding Wheel Institute and Abrasive Grain Association: Spring meeting, Homestead, Hot Springs, Va. Information: Hunter-Thomas Associates, 2130 Keith Bldg., Cleveland 15, O.

Apr. 23-26, Steel Shipping Containers Institute Inc.: Annual meeting, Palm Beach Biltmore hotel, Palm Beach, Fla. Institute's address: 600 Fifth Ave., New York 20, N. Y. Secretary: L. B. Miller.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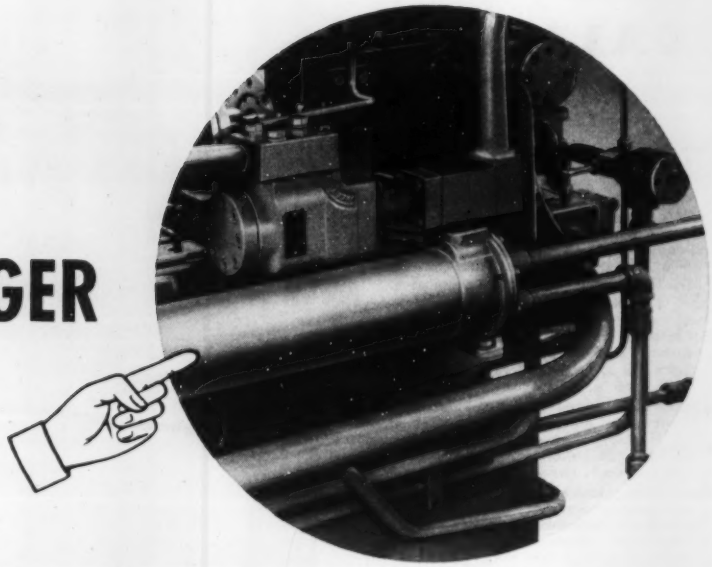
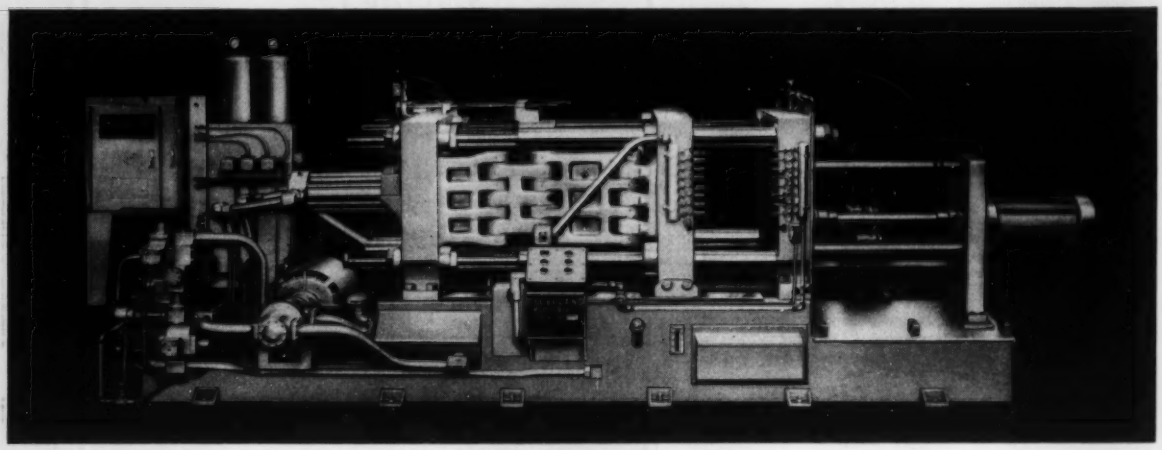
ROSS EXCHANGER



a built-in feature to insure full locking pressure



Cleveland Die Casting Machine with 600-ton locking pressure delivers precision-quality zinc castings up to 25 lbs.

"True locking pressure," says Cleveland Automatic Machine Company, "is as important in a die casting machine as accuracy in a machine tool or horsepower in a motor or engine. It determines whether or not the machine is able to safely withstand the high injection pressures necessary to produce sound, dense castings."

To insure full locking pressure of the die caster pictured above, Cleveland has installed a Ross Type BCF Exchanger as an important component of the hydraulic power system. Uniform temperature of the fluid is maintained at all times to prevent pump slippage and pressure variations caused by overheated, thinned oil.

Because of their record for ruggedness and thermal efficiency, Ross Exchangers are regularly furnished with extrusion and metal drawing presses, die casting machines, powdered metal presses, injection and compression molding machines, and numerous other types of hydraulic equipment.

Pre-engineered and fully standardized, they're available in a wide range of sizes to meet most heat transfer requirements. Bulletin 1.1K5 will give you detailed information. Write to Ross Heat Exchanger Division of American-Standard, Buffalo 5, N. Y. In Canada: American-Standard Products (Canada) Limited, Toronto 5, Ont.

ROSS HEAT EXCHANGER

Division of AMERICAN-Standard

THERE'S A
COMPLETE LINE OF ROEBLING

Galvanized

ROEBLING is a specialist in galvanizing, with practically unmatched facilities for producing galvanized wire in enormous quantities and in complete size ranges. Hot galvanized is available in sizes from .283″ to .035″... Roegal (drawn galvanized) from .187″ to .005″.

And Roebling galvanized wire can be packaged in the way most convenient and economical for you... in coil diameters of 60″, 30″, 22″, 16″ and 8″... on reels, spools or handy spoolless cores.

You *pay* for the best when you buy galvanized wire. Make sure you *get* it—specify Roebling! John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

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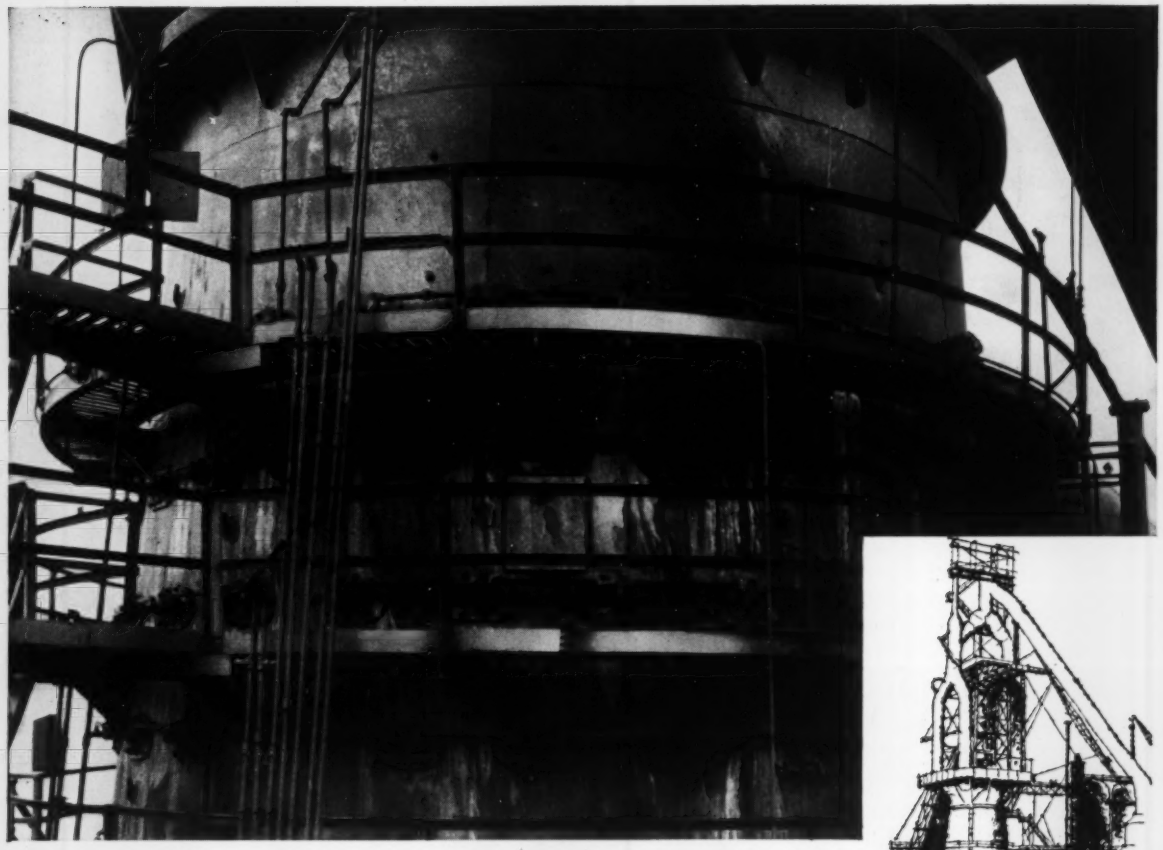

Why Airco 78E electrodes were selected to weld blast furnace "R"

A large eastern steel producer planned to build the giant blast furnace designated "R". Welding – with its obvious advantages of speed and economy – was naturally selected as the best method of construction.

But – which electrode would best do the job? These were the factors involved in making a decision:

(1) Quality of weld deposit. Welds had to be leakproof to contain the 15 lb. psi pressure in the vessel. **(2)** High ductility and tensile strength were of prime consideration. **(3)** An all-position electrode was absolutely essential.

The Airco 78E electrode answered all these qualifications. Therefore, it was the logical choice. A total of 13,500 pounds of Airco 78E electrodes were used to weld the structure.

In building a blast furnace – or rebuilding an engine housing – Airco's Electrode Pocket Guide can help you take the guess work out of selecting the right electrode for the job. This 44-page booklet contains neatly condensed descriptions, applications and procedures – plus charts and graphs – for using the complete Airco line of electrodes.

It's free. Write Airco, at the address below. Request Catalog 1318-ST.

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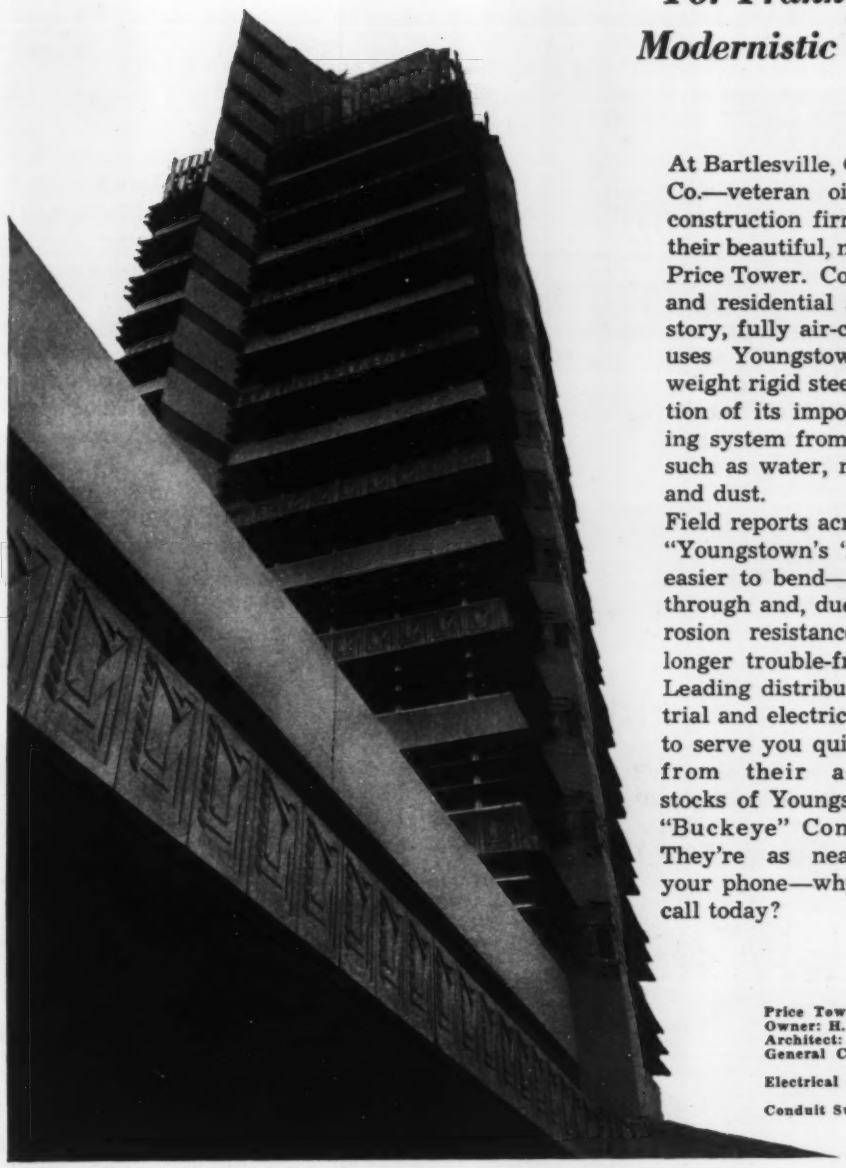
Products of the divisions of Air Reduction Company, Incorporated, include: **AIRCO** – industrial gases, welding and cutting equipment, and acetylenic chemicals • **PURECO** – carbon dioxide, liquid-solid ("DRY-ICE") • **OHIO** – medical gases and hospital equipment • **NATIONAL CARBIDE** – pipeline acetylene and calcium carbide • **COLTON** – polyvinyl acetates, alcohols, and other synthetic resins.

YOUNGSTOWN "BUCKEYE" CONDUIT

. . . *Provides Lifetime Wiring Protection For Frank Lloyd Wright's Modernistic Price Tower*



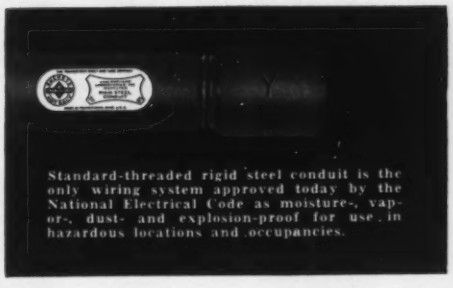
At Bartlesville, Okla., the H. C. Price Co.—veteran oil and gas pipeline construction firm — recently opened their beautiful, new cantilever-design Price Tower. Containing both offices and residential apartments, this 19-story, fully air-conditioned structure uses Youngstown "Buckeye" full-weight rigid steel conduit for protection of its important electrical wiring system from damaging elements such as water, moisture, vapor, dirt and dust.

Field reports across-the-nation state: "Youngstown's 'Buckeye' Conduit is easier to bend—easier to fish wires through and, due to its superior corrosion resistance, affords a much longer trouble-free service life."

Leading distributors in every industrial and electrical market are ready to serve you quickly and efficiently from their ample stocks of Youngstown "Buckeye" Conduit. They're as near as your phone—why not call today?

QUALITY YOUNGSTOWN SERVICE

Price Tower, Bartlesville, Okla.
Owner: H. C. Price Co.
Architect: Frank Lloyd Wright
General Contractor: Culwell Construction Co., Oklahoma City, Okla.
Electrical Contractor: Industrial Electric Co., Oklahoma City, Okla.
Conduit Supplier: Westinghouse Electric Supply Co., Oklahoma City, Okla.



Standard-threaded rigid steel conduit is the only wiring system approved today by the National Electrical Code as moisture-, vapor-, dust- and explosion-proof for use in hazardous locations and occupancies.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

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NATIONAL SEAMLESS

Crunching over the frozen Arctic in a tremendous cargo carrier is a far cry from fracturing the formation of a deep well in Texas. Yet, there is a definite link between them—NATIONAL Seamless, which makes them both possible. The versatility of NATIONAL Seamless Pipe and Tubes is almost unlimited because NATIONAL Seamless possesses all the fundamental *good* qualities which are so needed in so many industrial applications.

NATIONAL Seamless combines to the highest degree such vital qualities as strength, safety and workability. Uniform throughout and dimensionally accurate, NATIONAL Seamless Pipe and Tubes promise smooth installation and long satisfactory service. Available in a complete range of steel analyses, wall thicknesses and diameters, every foot is produced to exacting standards by the world's largest manufacturer of tubular steel products.

Bring your pipe and tubing problems to National Tube. Our engineers will be happy to provide any help they can.

1. This 252-mile gas line from Hebron, Pa., to Greenwich, Conn., was the world's first installation of National *Expanded Seamless* Line Pipe, a new product of National Tube. The 24-inch diameter pipe is easier to weld at all temperatures, yet possesses greater strength and uniformity than ordinary line pipe.

2. The LeTourneau Sno-Freighter is a giant, six-section, 125-ton capacity cargo carrier, designed to travel over ice, snow, bulldozed trails, or rough brush land. All of the car frames and coupling mechanisms were constructed from National's Shelby Seamless Mechanical Tubing.

3. 13,000 feet of National Seamless Deep Well Casing were used to fracture the formation of this non-producing oil well. Thousands of gallons of crude oil, sand, and flush oil were pumped down the hole at pressures up to 6,000 psi. In two days the well became a good producer. National Seamless Casing has the high collapse resistance and strength to withstand the intense pressures of just such jobs as this.

4. National Seamless Tubular Steel Piles provide low-cost support for heavy building loads. Their circular shape gives them outstanding strength, and, being hollow, they can be filled with concrete for greater loading capacity. They provide ideal foundations for roads, bridges and buildings.

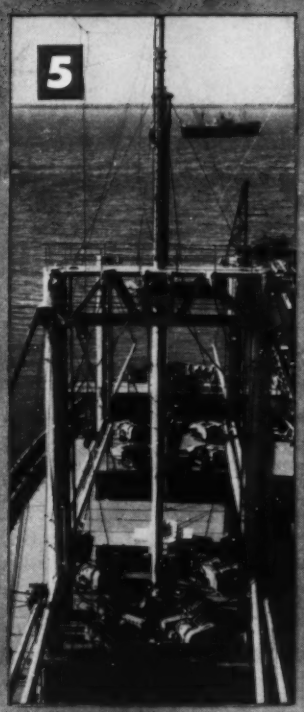
5. Marine Pipes and Tubes of National Seamless offer the greatest possible security as marine steam lines—bear up under high temperatures and intense pressures, year after year. National Seamless is strong, tough, uniform—has every qualification for any marine power piping system, small or large.

6. The National Seamless Method of manufacture is one of the most difficult forging operations in the steel industry. A billet of the finest steel is actually pierced to produce a seamless tube with absolutely uniform wall strength. No welds . . . no joints . . . no weaknesses.

SEE The United States Steel Hour. Televised alternate weeks. Consult your local newspaper for time and station.

U N I T E D S T A T E S S T E E L

PIPE AND TUBES



USS

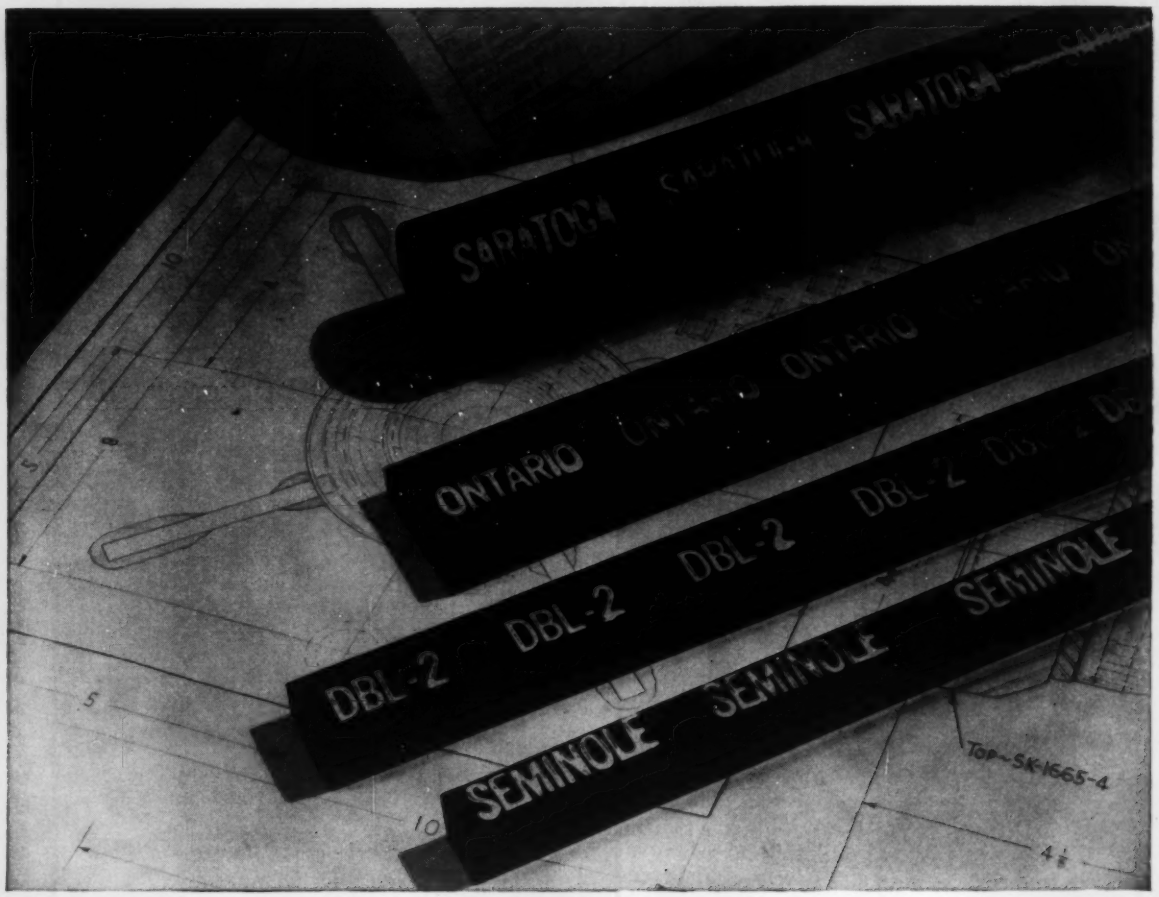
NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

NATIONAL SEAMLESS PIPE AND TUBES

WALLS WITHOUT WELDS

UNITED STATES STEEL



AL TOOL STEELS are *clearly* marked ... you can't mix up grades in your stock

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"TOOL STEEL HANDBOOK"

We say "production men only" because this is a *work* book, not a picture book. It's a case-bound volume of 196 pages, packed full of technical data on the analyses, uses, handling and shop treatment of all grades of A-L Tool and Die Steels. Sent free, but ask for it on your company letterhead, please.

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"What's *that* piece?" . . . "Are you *sure?*" . . . In anybody's toolroom or stock racks, the best inventory or material identification system is apt to go haywire once in a while—and sometimes with grievous results.

But not when you're using tool steel grades produced by Allegheny Ludlum! Each length of AL Tool Steel is clearly marked with its grade name every few inches the entire length of the bar—*stenciled* in such a manner that the marking stays bright and clear, and can't be blurred or erased in handling.

Even a small crop end on a machine bench is readily identifiable—you can't go wrong. And that's only a small part of the benefit you can realize by using AL Tool Steels—available from stocks coast to coast. Let our Metallurgical Service go to bat on some of your tougher tool steel problems. *Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.*

For nearest representative, consult Yellow Section of your telephone book.

For complete **MODERN** Tooling, call

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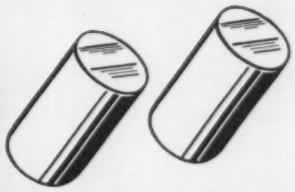
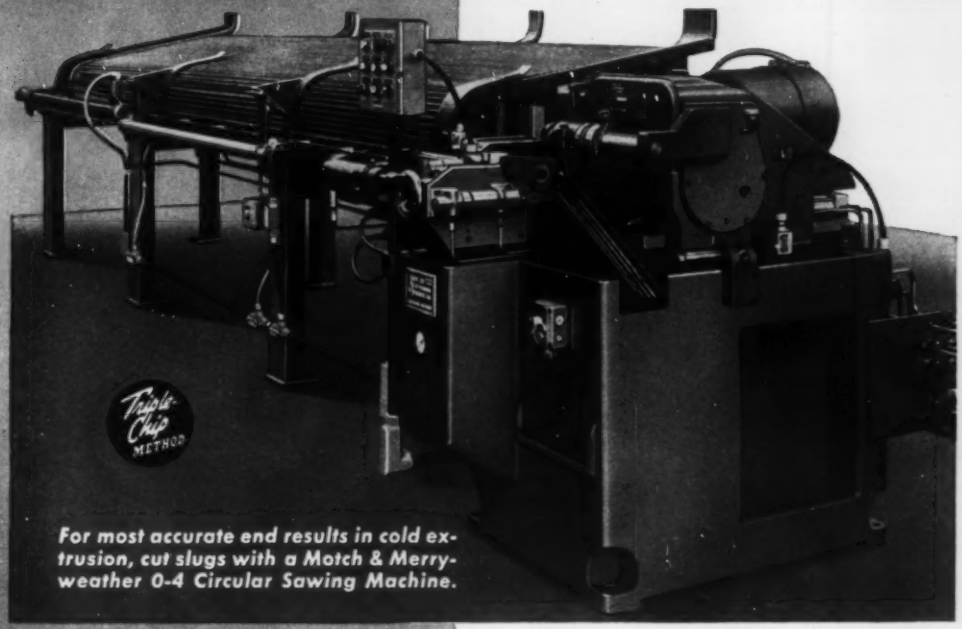
AL® FINE TOOL STEELS SINCE 1854

cold cuts

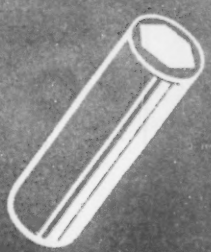


BY MOTCH & MERRYWEATHER



For most accurate end results in cold extrusion, cut slugs with a Motch & Merryweather 0-4 Circular Sawing Machine.

. . . make better COLD EXTRUDED PARTS



The Motch & Merryweather No. 0-4 Precision Circular Sawing Machine is automatic from the storage table to the finished cut slug. It cuts slugs accurate to ±.002" with uniformly square ends and minimum burr. Give your cold extrusion press the opportunity of producing more work than ever before, with more accuracy than ever before, at a lower cost per piece than ever before.

THE MOTCH & MERRYWEATHER MACHINERY CO.

MACHINERY MANUFACTURING DIVISION
CLEVELAND 13, OHIO

Builders of Automatic Precision Cut-Off, Milling and Special Machinery

No Commutators, No Rings, No Brushes, No Rotating Coils—in the NEW

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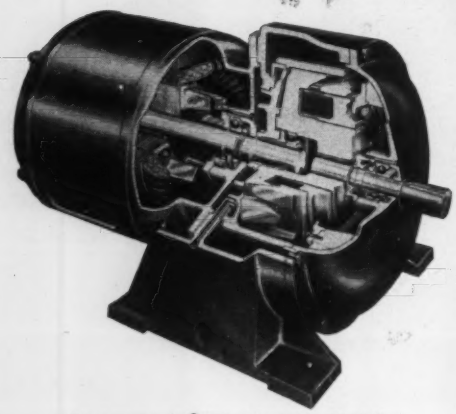
DYNAMATIC®

Adjustable Speed Drives



Dynaspede® Stationary Field Coupling, with Integral Motor

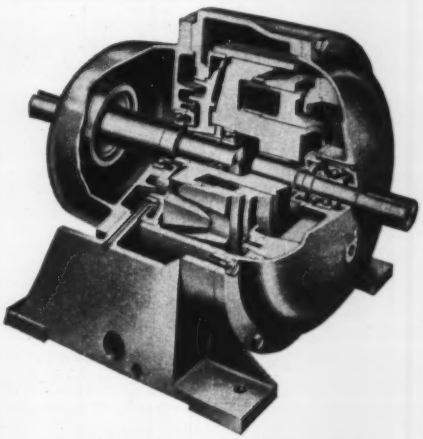
Dynamatic stationary field couplings are the simplest drives so far devised to provide infinitely adjustable speed from an alternating current source. The absence of rotating coils, brushes, slip rings, and commutators in this design holds wear and maintenance to an absolute minimum. Dynamatic electronic or magnetic amplifier controls, in combination with these drives, provide wide latitude in operating functions.

Check these Outstanding Advantages:

Accurate speed control • Wide speed range • Low power losses • Simple construction • Rapid response • Remote control • Quiet, efficient operation • Low maintenance costs

Ajusto-Spede® Drives: Air cooled, stationary field eddy-current couplings mounted integrally with D-flange open drip proof squirrel cage motors are available in capacities from 1 to 75 HP. Units of the same design and capacities are also available without motors.

Dynaspede® Drives: Liquid cooled, stationary field couplings mounted integrally with D-flange squirrel cage motors are available in capacities from 3 to 75 HP. Motor types available are drip proof, splash proof, totally enclosed fan cooled, and explosion proof. The coupling is totally enclosed. Separately mounted couplings are also available in capacities from 3 to 2500 HP and larger.



Stationary Field Coupling for use with Separately Mounted Motor

Send for Detailed Information on these New Stationary Field Couplings and Drives

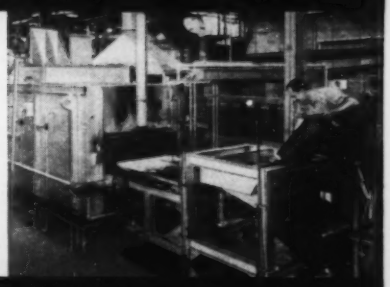
EATON

DYNAMATIC DIVISION
MANUFACTURING COMPANY
3307 FOURTEENTH AVENUE • KENOSHA, WISCONSIN

carbon-stabilized

PARKER-KALON stress relieved socket screws

All P-K® Socket Screws are hardened in a propane atmosphere in this Westinghouse furnace to prevent carbon loss, eliminate adsorption of foreign gases. Part of P-K's controlled processing which assures consistent high quality, prevents precipitation or crystallization. Another good reason why . . . *If it's P-K . . . It's O-K!*



PARKER-KALON DIVISION, General American Transportation Corporation • Manufacturers of Socket Screws, Self-tapping Screws, Screwnails, Masonry Nails, Wing Nuts and Thumb Screws.

Sold Everywhere Through Leading Industrial Distributors — Factory: Clifton, New Jersey • Warehouses: Chicago, Illinois; Los Angeles, California

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SERIES A, 5½-110 tons

SERIES AA, 32-200 tons

SERIES E, 75-200 tons
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READILY EQUIPPED TO HANDLE

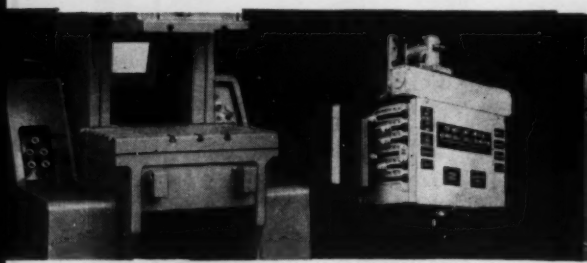
14 pt. Mechanical Sleeve | 18 pt. Electro-Pneumatic Sleeve | Electro-Pneumatic Friction | Single Cylinder | Tandem Type

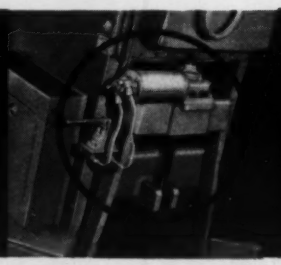
THREE TYPES OF CLUTCHES

Each Niagara Inclinable features the clutch best suited for the purpose. (1) Famed Niagara multi-jaw mechanical sleeve clutch. (2) Exclusive Niagara multi-jaw Electro-Pneumatic sleeve clutch. (3) Niagara low inertia Electro-Pneumatic friction clutch.

FOUR TYPES OF DIE CUSHIONS

Designed and manufactured by Niagara, single cylinder and tandem type pneumatic die cushions are built in 4 types to make any Niagara Inclinable a double action press. Self-lubricating models are available for automated OBI's.





SPECIAL BOLSTER PLATES

J.I.C. CONTROLS FLANGED SLIDES

POWER SLIDE ADJUSTMENT

FLYWHEEL BRAKE

DIE AREA LIGHTING

MOTOR CUTOUT SWITCH

EQUIPPED FOR AUTOMATION

Featuring the most advanced controls and devices, Series EA (automated models) are engineered for peak productive capacity. Here's a line of OBI's that is completely equipped by Niagara for operation in your automation lines.

POWER INCLINING DEVICE

Fast-acting, safe and easy to operate, Niagara's air motor inclining device (shown above) is furnished as an optional accessory.

WIDE CHOICE OF ACCESSORIES

With a full selection of modern press accessories available, Niagara Standard Inclinables are adaptable to the widest possible range of job assignments.

standard OBI presses in all sizes and types that are right for you!

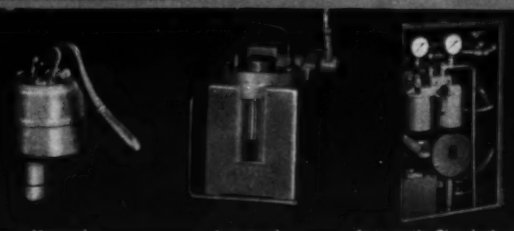
SERIES EA (Automated), 75-200 tons
Front-to-Back Crankshaft

SERIES BI, 60-200 tons
Double Crank

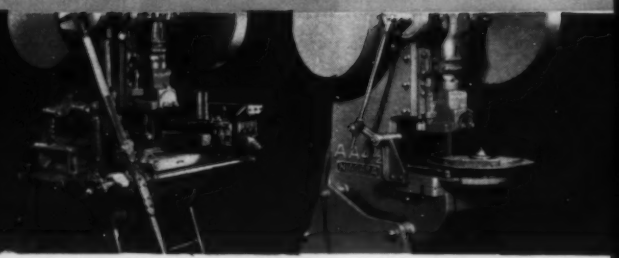
5 LINES 34 MODELS
EACH A CHAMPION IN ITS CLASS

Niagara offers you industry's most complete, most modern, and most exclusive selection of standard inclinables . . . plus an unequaled choice of press accessories and automatic devices to meet your specific job requirements. You can count on Niagara for inclinables that will do the most to speed production, assure accuracy, prolong die life and hold down maintenance costs within your plant.

YOUR WORK MOST PROFITABLY



Manual Automatic Automatic Circulating



CENTRALIZED LUBRICATION TO FIT THE NEED

Niagara Inclinables are readily equipped with either manually-operated or automatic lubricators, or automatic circulating oil systems. It's one of the many ways in which Niagara outfits standard inclinables to meet individualized requirements.

ALL TYPES OF AUTOMATIC FEEDS

To speed production, Niagara Inclinables are easily equipped with complete, automatic feed arrangements: single roll, double roll, dial, chute, magazine and specially engineered types. Variable speed drives can be provided to allow adjustment for the optimum speed consistent with the die, material and feed length.

NIAGARA

America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work

GET ALL OF THE FACTS on any or all Niagara Inclinable Presses. Consult with a Niagara representative. His recommendation will be impartial. He has all types of OBI's to offer. At your request, specific Bulletins on each series, containing complete information and specifications, will be mailed to you promptly

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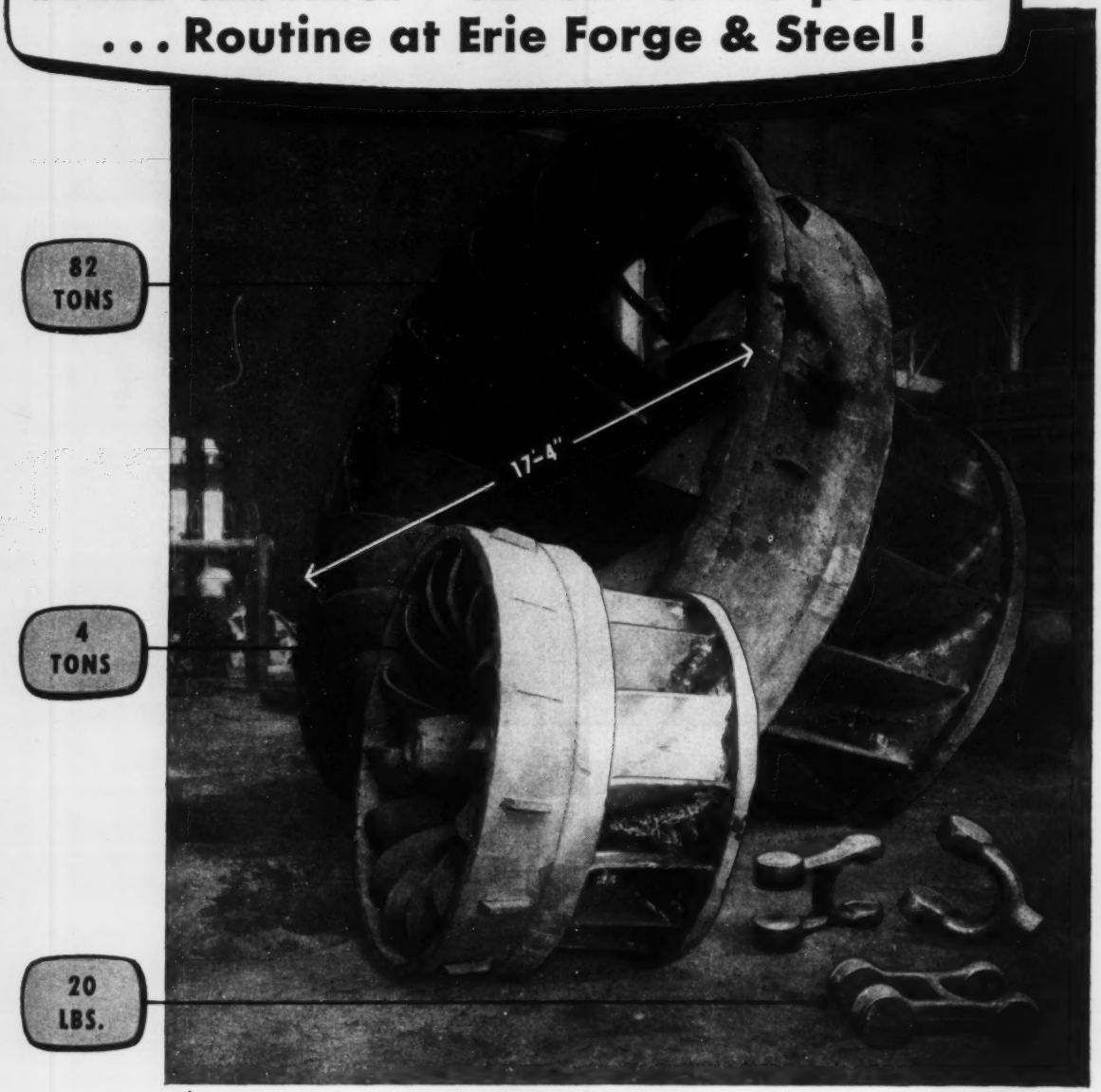
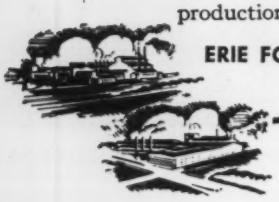
STEEL CASTINGS - 82 tons or 20 pounds ... Routine at Erie Forge & Steel!



A LONG JUMP from "the largest steel water wheel ever cast in one piece", 82 tons of it, to a 20 lb. engine casting : : : Routine at Erie Forge & Steel. Here is definite proof of our versatile production capabilities.

Engineers and metallurgists team up here with skilled craftsmen to control the production of steel castings and forgings from raw materials to finished product.

For example, engineering, metallurgy and production followed the 82 ton casting every step from raw materials to railroad spur to assure dimension and specification accuracy. "One responsibility and one control" is more than a slogan — here, it works for you.



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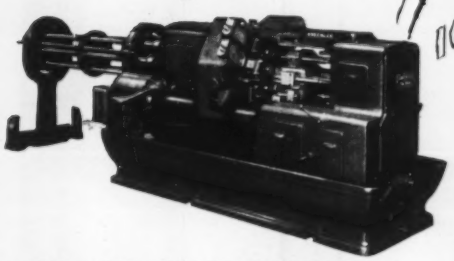
Dependable...

always on the job

PRODUCTION MACHINERY

GREENLEE Automatic Bar Machines



SIX AND FOUR-SPINDLE AUTOMATIC BAR MACHINES

GREENLEE Special Machine Tools

- Multiple-Spindle Drilling and Tapping Machines
- Transfer-Type Processing Machines
- Hydro-Borer Precision Boring Machines

BOOST PRODUCTION REDUCE DOWN TIME

It's easy to maintain rigid production schedules . . . prevent costly bottlenecks with Greenlee Bar Automatics. They are always on the job . . . give continuous, reliable service.

You hear much comment about Greenlees' uninterrupted, round-the-clock performance in widely different industries. With good reason, too, for Greenlee offers years of manufacturing experience... plus manufacturing integrity not often duplicated.

Want complete information? Call in the Greenlee man. Let him give you the complete story. Please submit a print when inquiring about a specific job.

WRITE FOR CATALOG No. A-405

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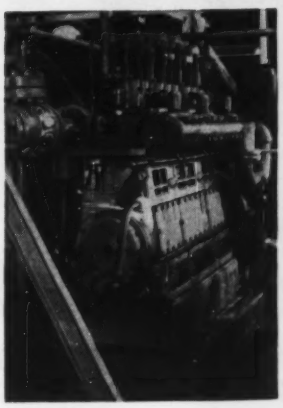
"It'll pay us to replace it with an ALDRICH PUMP!"

Downtime, due to pump failure, is always a costly item. It takes the reliability and freedom from maintenance found in an Aldrich Pump to assure 100% availability of hydraulic power.

The very simplicity of the Aldrich Direct Flow design means horizontal straight line flow from suction to discharge. Reduced space between valves results in higher volumetric efficiency. Fluid-end sectionalization for fast, easy maintenance; changeable plunger sizes; and interchangeability of parts are additional reasons why Aldrich Pumps have earned a reputation for dependable, low cost performance on applications such as die casting, hydraulic press operation, roll balancing, descaling and hydraulic testing.

For your tough pumping problems, it pays to specify Aldrich. Write today for a copy of Data Sheet 100, a condensed catalog and selection chart covering our entire line. The Aldrich Pump Company, 18 Pine Street, Allentown, Pa.



Four 5" stroke Aldrich Direct Flow Pumps on die casting service in a midwestern metalworking plant. These pumps are handling 250 gpm at 1500 psi.

THE ALDRICH PUMP COMPANY

if you need only a little bit

If your requirements for special steel are small – say, just a box of high-speed tool bits or a few pounds of special alloy steel – come to your nearby Crucible warehouse. Every warehouse in our nationwide chain is geared to handle your requirements, whether you buy by the pound or the ton. And each carries full stocks of:

Rex High Speed Steel . . . ALL grades of Tool Steel (including Die Casting Die and Plastic Mold Steel, Drill Rod, Tool Bits, and Hollow Tool Steel Bars) . . . Stainless Steel (Sheets, Bars, Wire, Billets, Electrodes) . . . Max-el, HY-Tuf, AISI Alloy . . . Onyx Spring, Hollow Drill Steel and other special purpose steels.

So, for prompt, complete special steel service – regardless of the size of your order – call Crucible – *big enough to serve you . . . small enough to want to.*

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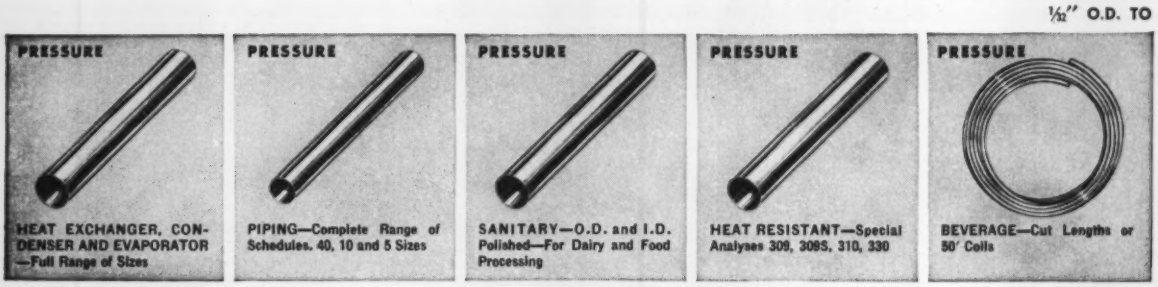
General Sales Offices, The Oliver Building, Mellon Square, Pittsburgh, Pa. Branch Offices and Warehouses: Atlanta • Baltimore • Boston • Buffalo • Charlotte Chicago • Cincinnati • Cleveland • Dayton • Denver • Detroit • Houston • Indianapolis • Los Angeles • Milwaukee • Newark • New Haven • New York Philadelphia • Pittsburgh • Providence • Rockford • San Francisco • Seattle • Springfield, Mass. • St. Louis • St. Paul • Syracuse • Toronto, Ont.

STAINLESS STEEL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HEAT EXCHANGER, CONDENSER AND EVAPORATOR —Full Range of Sizes
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PRESSURE
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BEVERAGE—Cut Lengths or 50' Coils

1/2" O.D. TO

World's Largest Producer of SPECIALTY WELDED TUBING Offers Your Most Complete Source of Supply

You can find a tube to fit any requirement in Republic's full quality line of welded steel tubing.

Manufactured at the Steel and Tubes Division, Republic Tubing is welded by the ELECTRUNITE Process . . . a Continuous Electric Weld method that unites the wall under pressure without the addition of foreign or extra metal. Among other advantages this process assures uniformity of wall thickness, strength, ductility, concentricity, diameter and physical and mechanical properties.

Republic, the pioneer in this improved welding technique, is proud of its many "firsts" in the industry. In addition to introducing ELECTRUNITE® Boiler Tubes to the trade more than 25 years ago —plus Electrical Metallic Tubing and Dekoron®-Coated E.M.T. to the electrical industry, Republic was the first to provide a non-destructive electronic production method of testing tubing used for critical pressure applications, known to the trade as FARROWTEST®.

With plants in four locations, we are able to service you promptly with these complete ranges of analyses of carbon and stainless steels for mechanical, structural and pressure uses. A wide selection of sizes for every tube is also available. (See captions.)

Next time you need tubing or electrical raceways, whatever the application, call your nearest Steel and Tube Representative. Or contact us direct. We've solved a lot of problems in 50 years, and we'll be happy to tackle yours. To get descriptive literature, mail coupon at right.

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World's Widest Range of Standard Steels

TUBING AND PIPE

40" O.D.

AIRCRAFT—Exhaust Stacks, Hydraulic Lines and Duct Tubing

SPECIAL BRIGHT ANNEALED—Up to 4" O.D.—Special Shiny Surface

FULL FINISHED—Annealed and Tested for All Mechanical Uses—All 300 Series Analyses

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HOT ROLLED—¾" thru 5" O.D.—16 Ga. and Heavier

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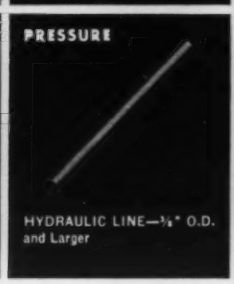
AIR PRE-HEATER—Full Range of Sizes

HYDRAULIC CYLINDER—Up to 3¾" I.D. x .187" Wall—Special Smooth Finish



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E.M.T. ⅜" THROUGH 2"—RIGID STEEL CONDUIT ½" THROUGH 6"

E.M.T.—⅜" thru 2"—Inch-Marked® & Guide-Lined, Inside Knurled in Popular Sizes

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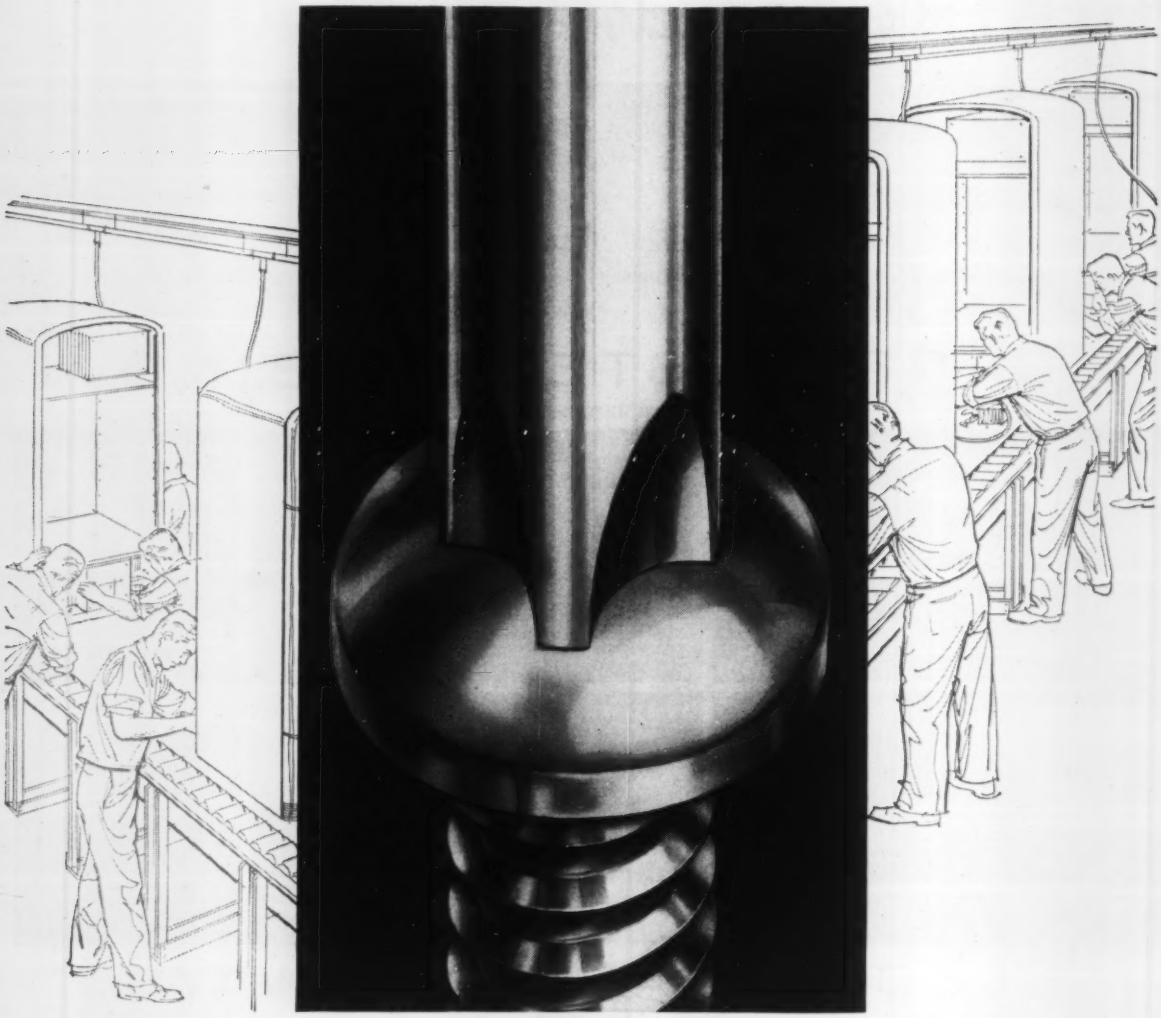
- ☐ Carbon Steel Tubing — Type_____
- Electrical Raceways — ☐ Electrical Metallic Tubing
  - ☐ Rigid Steel Conduit
  - ☐ Dekoron-Coated E.M.T.

Name_____Title_____
Company_____
Address_____
City_____Zone_____State_____



They may appear the same, but . . .

AMERICAN is the name!

Four factors usually determine your actual fastening costs:

1. Price	**3. Quality**
2. Service	**4. Research**

Occasionally local price differentials may seem worthwhile, but no one gives you more of all four than American.

American Gives You More of All Four

In Service — where regardless of geographical location American is constantly meeting required delivery schedules.

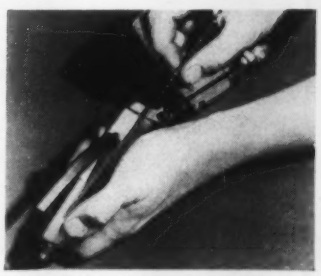
In Quality — that's a product of the machine, confirmed at the inspection table.

In Research — where American Engineers have not only developed the internationally accepted Phillips Head Fastener, but have created such exclusive products as SCREWSTICK for companies with unique fastening problems. SCREWSTICK enables power driving to replace the individual handling of small, tedious-to-manage screws resulting in cost savings exceeding 4 to 1.

You can use these same facilities to increase production, cut costs and boost quality, because no one gives you more of all four factors: *price*, *service*, *quality* and *research* than American.

Find out for yourself. Send us your inquiry for price and delivery or your specifications for special fasteners. Write:

American!



SCREWSTICK being loaded into air-powered driver.

AMERICAN SCREW COMPANY
Willimantic, Connecticut
Norristown, Pa. • Chicago, Ill.
Detroit, Michigan

SELECTOR GUIDE FOR LINCOLN ELECTRODES

FOR GENERAL FABRICATING

Fleetweld 7, E-6012—For quality welds in flat and horizontal fillet position, particularly for joints with poor fit-up. Good slag control and coverage. Can be used in all positions. Operates on AC or DC.

Fleetweld 37, E-6013—For mild steel or low alloy steel of 3/16" thickness or less. Exceptionally good slag control welding vertical down. Good build-up, little burn-through on light gauges with poor fit-up. Operates on AC or DC.

"Improved" Fleetweld 47, E-6013—Fast welding and easy operation result from this iron-powder electrode's high deposition rate and smooth arc action. Very easy slag removal. Operates in all positions on AC or DC.

Fleetweld 5, E-6010—An all-position, deep penetrating, high ductility electrode for fitting, tacking and welding root passes in general fabricating applications. Operates on DC.

FOR HIGH-SPEED PRODUCTION

Jetweld 1, E-6024—A fast electrode with a heavy iron-powdered coating for flat and near-flat positions. Ideal for welding higher carbon steels—gives sound welds where conventional E-6012 and E-6013 welds will crack. Bead appearance compares with automatic "hidden-arc" welds. Welds are self-cleaning. 25% to 50% higher deposition rate than E-6012 and E-6013 electrodes. Operates on AC or DC.

"Improved" Fleetweld 47, E-6013—An iron-powder electrode for all positions. Easy operating. No tendency to stick. High deposition rate. Arc speed 10% to 30% higher than other E-6013 electrodes. Up to 30% more weld per electrode. Easy slag removal, low spatter. Operates on AC or DC.

Fleetweld 72, E-6012—For high speed production welding of lap and fillet welds in mild steel. Operates best at higher currents than ordinary E-6012 rods, at very high melt-off rates . . . without overheating. Arc characteristics assure proper penetration on fillet welds without sacrificing speed. Operates on AC or DC.

FOR HARD-TO-WELD STEEL

Shield-Arc LH-70, E-6016—A low hydrogen electrode for steels of poor weldability. Typical applications: low alloy, high tensile steels which cannot be preheated; high sulphur steels; high carbon steels; high silicon electrical sheet steel; and welds to be porcelain-enameled or other applications where best physicals are required. Operates on AC or DC in all positions.

Jetweld LH-70, E-6016—A low hydrogen, iron-powder electrode with higher arc speeds and higher deposition rates. Especially suited for crack sensitive steels, alloy steels that must be welded without preheating, free machining steels, steels to be enameled, and medium-to-high carbon steels. Operates on AC or DC in all positions.

FOR STRUCTURAL FIELD WELDING

Fleetweld 5, E-6010—For deep penetration and high physical properties. For all positions with exceptionally good operating qualities in overhead or vertical positions. Produces a flat bead with easy slag control and removal. Operates on DC.

Fleetweld 35, E-6011—For deep penetration and high physical properties with AC. Excellent operating qualities in vertical or overhead positions.Good arc striking characteristics and arc stability. Operates on AC or DC.

Jetweld LH-70, E-6016—For structural welding where codes require use of low-hydrogen electrodes. Combines desired high physical qualities with all-position welding. Operates on AC or DC.

FOR PIPE WELDING

Fleetweld 5, E-6010—Has proven ability to pass bend, nick-break, X-ray, and other pipe welding tests. Good penetration and high physical properties. Also meets ASME requirements for pressure vessel applications. Operates in all positions on AC or DC.

Fleetweld 5-P, E-6010—For stringer beads, vertical up or down. Designed for deep and uniform penetration. Produces a good interior or backside bead. Fast freeze and good follow, easy cleaning. Deposit is free of windows and pinholes. Operates in all positions on DC.

Shield-Arc 85, E-7010—An all-position, high-tensile electrode for welding pipe for oil and gas lines. Good arc action and excellent physical properties. Operates on DC.

LOW ALLOY, HIGH TENSILE STEEL AND PIPE

Jetweld 2-HT, E-7020—For extra fast welding in new high tensile steels. Used in flat position, deep groove joints and fillets. Operates with a smooth, very stable arc action. Practically no spatter, welds are self-cleaning. Bead shape is flat. Operates on AC or DC.

Shield-Arc 90-CM, E-9010—A shielded-arc type electrode designed for power piping field where 1¼% chrome and ½% moly pipe is used. Also used for all position welding of other high tensile, low alloy steels. High deposition, little slag interference for vertical and overhead welding. Operates on DC.

Shield-Arc 85, E-7010—An all-position electrode for welding high tensile steels. Excellent for welding high test line pipe. Is smooth flowing, has high melt-off rate and low slag loss. Operates on DC.

Write for Weldirectory SB-1351

THE LINCOLN ELECTRIC COMPANY

Dept. 1627 • Cleveland 17, Ohio

Lincoln . . . one dependable source for all your arc welding needs

A whale of a hook: Monel alloy's strength, corrosion resistance, and weldability assure lightweight design...long life. Youngstown Welding & Engineering Company fabricated the hook section at left entirely of Monel; the lifting beam is Monel-sheathed steel.

Giant hairpins to lift 3 tons:

Youngstown builds high-capacity hooks of Monel...for extra years of pickling

This hairpin hook . . . and 37 like it . . . will carry 6,000-pound loads along the pickling line of a major wire producer.

A big hook, indeed! Big and tough, it lifts twice its own weight. Yet it's *light* for the work it does.

A close look shows you why. Youngstown has welded together thin sections of sturdy, wrought Monel* nickel-copper alloy plate and bar . . . to achieve maximum payload, minimum deadweight.

Why Monel pays off with greater payloads

Three reasons. First, Monel alloy is strong . . . the strongest non-ferrous metal used for pickling equipment. Second, it resists corrosion by the common pickling solutions . . . eliminates need for extra metal as corrosion allowance. Third, it is readily fabricated . . . easy to weld.

These properties mean longer service, too

The combination of strength and corrosion resistance of Monel that holds down deadweight also adds years to the life of pickling equipment. That's a matter of record in plant after plant.

It's *already* a matter of record for the purchaser of Youngstown's 38 giants. In another of this company's mills, Monel hooks outlasted another construction in seven years of side-by-side service on a heavy pickling line. *In fact, those Monel hooks are still in excellent condition.*

Expect Monel equipment to save money on *your* pickling line . . . by carrying heavy loads with minimum deadweight, by lasting longer. "Equipping the Pickle House for Greater Production at Lower Cost" . . . an informative 32-page booklet . . . shows you where and how. For your copy, write:

The International Nickel Company, Inc.
67 Wall Street New York 5, N. Y.
*Registered trademark

INCO NICKEL ALLOYS

Monel . . . *for proved pickling life*

STEEL
April 1, 1957

Metalworking Outlook

The Beck Affair

Disclosures about the Teamsters are putting a crimp in the organizing activities of other unions. At least one United Auto Worker official privately admits: "White-collar workers are sensitive about joining a union anyhow. The Beck affair will make them more leery than ever about organized labor, even though most unions are clean." Another result of the Beck situation: It's likely that changes in Taft-Hartley will at last be voted by aroused congressmen.

Tough Labor Year

This is proving a tough labor year for companies whose contracts are expiring. Because there are no pattern settlements and because there is a profit squeeze, these firms are in an unusual number of serious deadlocks. Examples: United Steelworkers is waging long strikes against International Nickel Co. in West Virginia and Woodward Iron Co. in Alabama. The UAW is unusually adamant about the union shop and has just won it in the automotive division of Electric Storage Battery Co.

Private Pensions: Enough Control?

More than 20,000 private retirement plans covering 12.5 million people now operate in the U.S., estimates the National Planning Association. Some 22 million workers may be covered by 1960. The assets of private plans are increasing at an estimated annual rate between $2.5 billion and $3 billion. By 1960, the annual rate of payments to meet pension obligations will be about $6.6 billion. That's why more should be known and closer controls exercised over the workings of those plans.

Another Approach to Engineer Shortage

Look for President Eisenhower's National Committee for the Development of Scientists & Engineers to come up with some answers to the engineering shortage by the end of the year. Dr. Eric A. Walker, committee vice chairman and president of Pennsylvania State University, will lead a task force of manpower experts to look into local conditions at Cleveland; Cincinnati; Philadelphia; Los Angeles; Seattle; Lowell, Mass.; York, Pa.; Wilmington, Del.; and Tulsa, Okla. Emphasis will be on more efficient use of our present force of 500,000 engineers.

The Riddle of 40 and 14

Industry's professional managers will need to use every available factor to solve the riddle of 40 and 14 in the next ten years. General Electric Co.'s vice president of manufacturing, Arthur F. Vinson, says management faces the vexing problem of meeting an anticipated demand of 40 per cent more products with only 14 per cent more manpower. He suggests the answer

Market Outlook—p. 131

lies in greater use of value analysis, quality control, manufacturing engineering and automation.

Some Equipment Orders Slip

New orders for industrial equipment are dropping off from year-ago highs, although shipments are holding up well. Examples: New orders reported by makers to the Resistance Welder Manufacturers Association totaled $7.3 million in the first two months this year, compared with $11.7 million in the same 1956 period. The Industrial Heating Equipment Association reports orders for industrial furnaces over the two months hit $15.8 million this year, compared with $22.4 million in 1956. Induction and dielectric heating equipment orders rose to $2.9 million in 1957's first two months from $2.1 million last year.

Steel Needs Rise for Offshore Drilling

Steel requirements for offshore gas and oil drilling will average 350,000 tons annually through 1960 and reach nearly 700,000 tons a year by 1970. So predicts Henry J. Wallace, sales vice president for U.S. Steel Corp.'s National Tube Division. Offshore drilling operations will increase from about 600 well completions this year, with total footage exceeding 5.5 million ft, to 1000 wells and 10 million ft drilled annually before 1965.

Census Speeds the Clock

Old and new rates of the Census Bureau's chart depicting growth of the U.S. population: Net gain—from 1 every 12 seconds to 1 every 11 seconds; births—from 1 every 8 seconds to 1 every 7.5 seconds; deaths—from 1 every 21 seconds to 1 every 20 seconds; immigrants—from 1 every 2 minutes to 1 every 1.5 minutes; emigrants—from 1 every 24 minutes to 1 every 20 minutes.

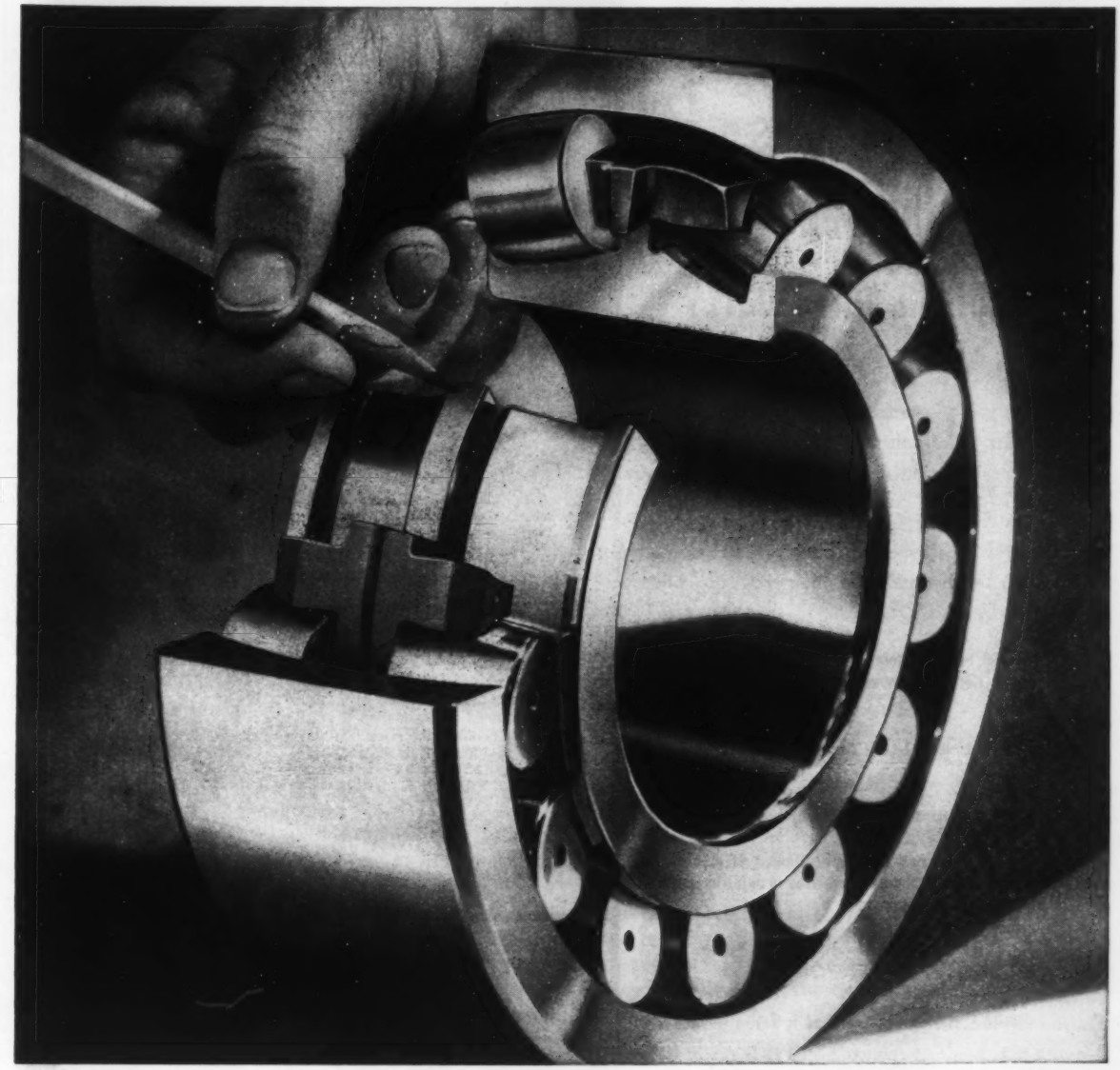
Coming: Senate Study of Basic Industries

Business practices in steel, aluminum and copper will soon get the attention of Sen. John Sparkman's (Dem., Ala.) Small Business Committee. Watch for special reference to: 1. Charges of refusal to sell. 2. Allocation plans. 3. Bidding practices. 4. Pricing policies. A report by Dr. Vernon A. Mund of the University of Washington will touch off the investigation.

Straws in the Wind

On May 1, Rotary Electric Steel Co. will become the Stainless Division of Jones & Laughlin Steel Corp. . . . Construction contracts in the U.S. for February hit $2.2 billion, off 3 per cent from February, 1956; but January-February totals this year equal those of the same months last year . . . The American portion of the St. Lawrence Seaway is about 30 per cent finished.

TORRINGTON *SPHERICAL ROLLER* BEARINGS



"This flange guides the rollers to peak performance!"

The center flange on the inner raceway of the TORRINGTON Spherical Roller Bearing positions the rollers to handle thrust loads. This accurate positioning also assures radial stability of the rollers under heavy loads—even at continuous high speeds and under conditions of misalignment.

This superior design feature is only one of many advantages you get when you specify TORRINGTON. For example, you get the service of TORRINGTON'S experienced engineers, who will help you with design and maintenance problems—or design custom bearings for special applications.

For long, low-maintenance service in heavy-duty applications, order TORRINGTON Spherical Roller Bearings. They're available from stock with either straight or tapered bore, for shaft or adapter mounting.

THE TORRINGTON COMPANY
South Bend 21, Ind. • Torrington, Conn.
District offices and distributors in principal cities of United States and Canada

TORRINGTON BEARINGS

Spherical Roller • Tapered Roller • Cylindrical Roller
Needle • Ball • Needle Rollers

How Armco 17-4 PH Stainless cuts costs, resists galling and corrosion in valve parts

Ruggedness and resistance to corrosion are prime requisites for relief valves that serve boilers and pressure lines in refineries and chemical plants.

Farris Engineering Corp., the manufacturer of this safety valve, uses special Armco 17-4 PH Stainless Steel for the disc and stem retainer . . . the core of the unit. Here's why:

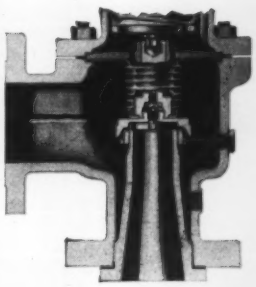
1. Costs are lower because there is no re-machining or grinding after hardening. No distortion occurs during low temperature heat treatment.

2. Parts made of Armco 17-4 PH have high hardness and resistance to galling.

3. Good resistance to impact is provided by this special steel.

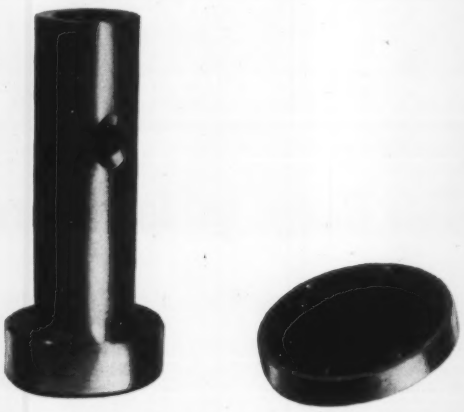
4. Since Armco 17-4 PH has a lower coefficient of expansion than the non-hardenable stainless grade used in adjoining parts, a cause of "hanging" is eliminated.

Stem retainer and disc of Armco 17-4 PH Stainless form the tough "heart" of this relief valve, serving on a pressure line in a chemical processing plant. Both parts shown were finish-machined before hardening because this special steel doesn't distort during heat treatment.



ELIMINATE 4 SHOP OPERATIONS

Finish-machine, then heat treat at low temperature —and a part made of Armco 17-4 PH is ready for assembly. You can eliminate re-machining or grinding, stress relieving, pickling, and straightening operations.



Armco 17-4 PH is available in billets, bars and wire. A companion grade, Armco 17-7 PH Stainless, is produced in sheets, strip, plates, billets, bars and wire. Write us at the address below for full information about these special new precipitation-hardening stainless steels.

ARMCO STEEL CORPORATION

957 CURTIS STREET, MIDDLETOWN, OHIO • SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

How Much Is $1 Billion?

This magazine's 32nd annual financial analysis of the steel industry (opposite page 58) shows that 33 companies with 93.34 per cent of the nation's steel capacity had record earnings of $1,059,679,049 in 1956.

That's a great deal of money any way you look at it. But is it enough?

The industry is engaged in a long term expansion program to meet the needs of a growing population. It has added 42.3 million tons of capacity since World War II at a cost of $8 billion. It will add another 18.5 million tons by Jan. 1, 1961, at a cost of $7 billion. It also must gradually replace aging and inefficient plant and equipment.

The industry faces the serious problem of finding funds to finance expansion and replacements. They must come from these sources: Equity financing, net profits after taxes and depreciation allowances out of profits on existing facilities.

Equity financing has proved to be a comparatively unimportant source of new money.

High taxes cut deep into profits. In 1956, the Internal Revenue Service alone collected over $1 billion—almost as much as the 33 companies were able to retain.

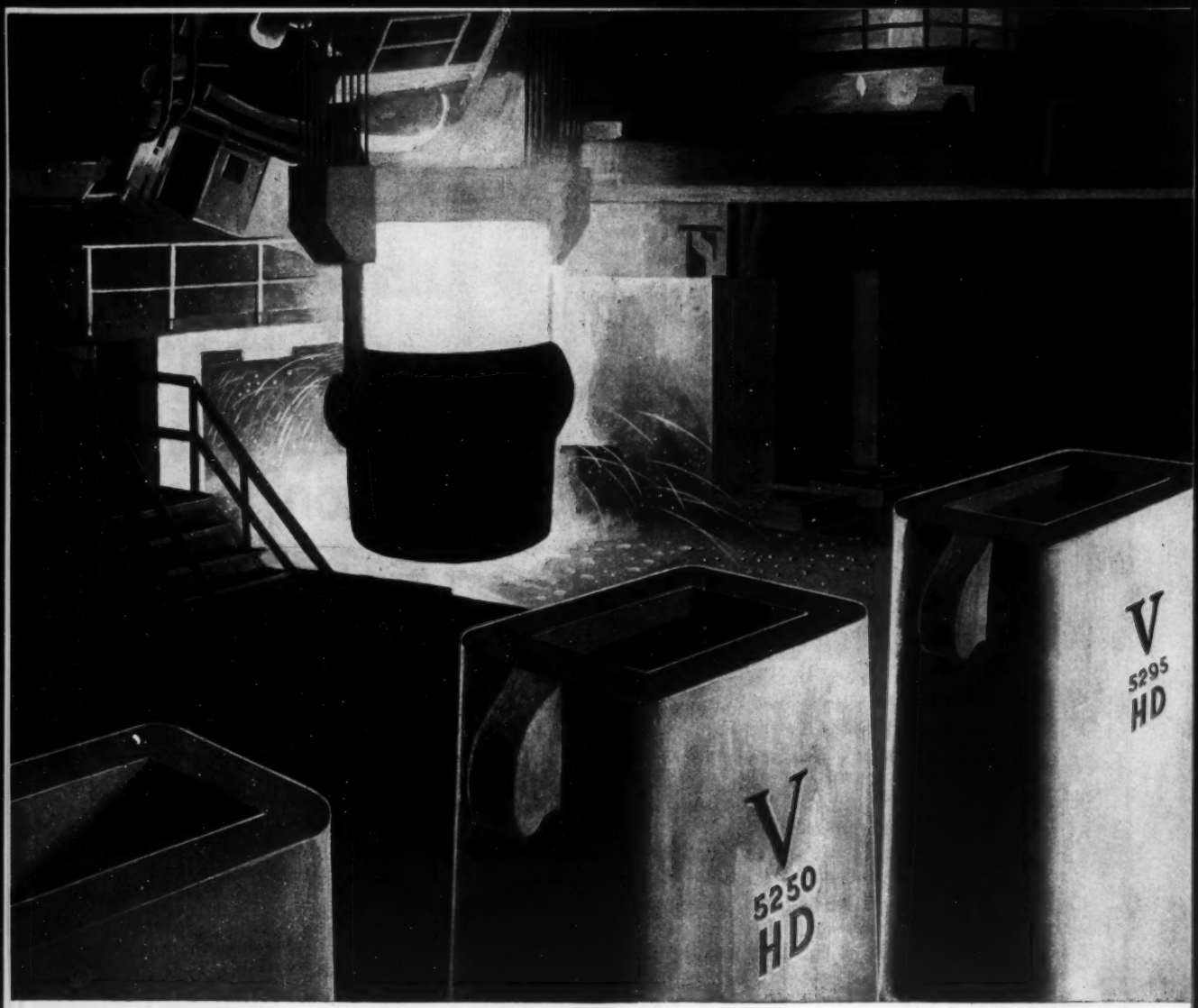
Depreciation provides only part of the funds needed. It is charged solely on the basis of original costs which are far lower than today's. While the industry managed to retain over $1 billion in profits last year, it also paid out $1.2 billion for new construction and equipment. Allowances for depreciation, including depletion of resources, amounted to only $720 million. An impairment of working capital and a reduction in the ratio of current assets to current liabilities resulted.

Financially, the industry was slipping backward in 1956, although its profits give you the illusion that it was running forward.

The crux, of course, is the cost-price inflation that has become a built-in part of our economy. New facility costs are three times higher than they were prewar and still heading upward. Present depreciation provisions will leave the industry $3 billion in the hole as it makes replacements over the next five years. By 1960, replacement costs will be twice the sum that can be set aside for depreciation.

Outmoded tax laws need overhauling. Perhaps replacement should be considered a production cost like materials and labor. Under such circumstances, a $1 billion profit would mean something.

Irwin H. Such
EDITOR-IN-CHIEF



All ingot moulds by Valley are designed for individual steel plant conditions. These moulds have been proven the highest quality available to the steel producing industry today.

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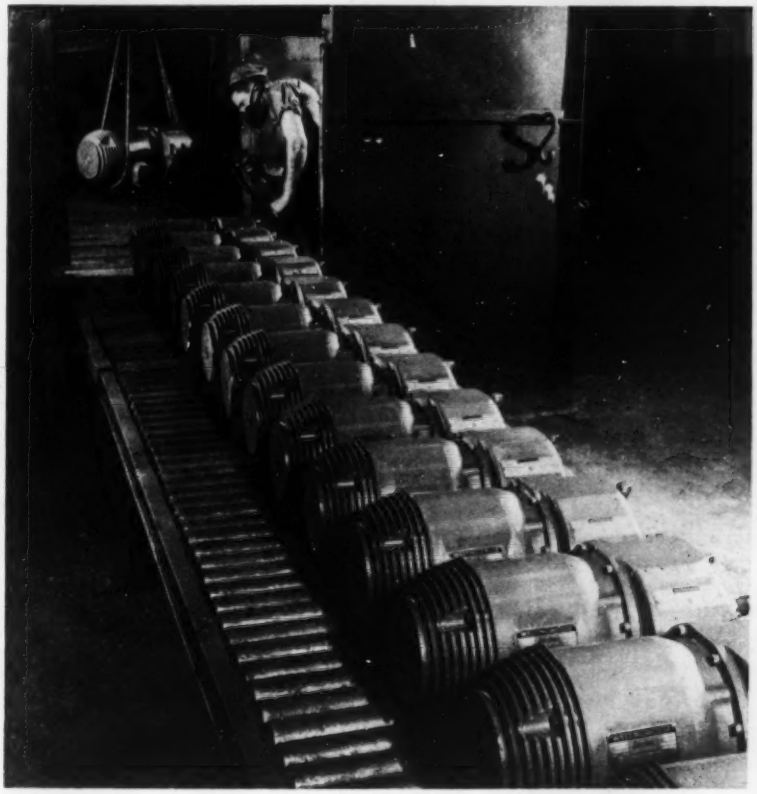
Western Office: Chicago, Illinois

Northern Office: Cleveland, Ohio



Westinghouse Electric Corp.

Business outlook considered "good" as . . .

Components Pace Robust '57

COMPONENTS may have their best year in 1957.

An overwhelming majority of component manufacturers think business will be at least as good this year as it was in 1956, probably better. Of 18 component industries surveyed, 17 think their business volume will stay as high as it was in 1956; only one (screw machine products) sees a downward trend. None of the 18 predicts any dramatic increase.

As basic manufacturers of parts for industry, component makers are often the bellwether of business slumps and upswings.

If auto production falls off this year, some manufacturers will be hurt. But the car picture still looks promising. (Some Detroit spokesmen say production might stop at last year's figure, but dollar sales will be more. See page 65.) Even if there's a dip in autos, it won't hurt as much as in the past. Reason: Diversification programs designed to take up slack caused by a slump in any one user industry.

Falling inventories of component buyers (see page 133) don't depress manufacturers. It's merely a reflection of a changing buying pattern, they say.

Here's how the situation shapes up in 18 major component categories:

Castings, Gray Iron—Shipments should exceed the 14-million-ton figure set in 1956. Orders have temporarily slowed down because of customer reduction in inventories, but dollar volume of sales could go over $3 billion this year if orders pick up as expected. Production and shipments are almost identical; both should increase later in year. Backlogs are falling.

Castings, Malleable—New orders are running better than they did in 1956. If auto production declines, year-end sales volume could go down, but nonautomotive sales will be at least as good as they were last year. Backlogs are declining slightly; production remains about the same. Total gross sales for the year should hit the 1956 figure of $350 million.

Castings, Steel—1957 should be as good as 1956 when the industry had shipments of 1.9 million tons and gross sales of $950 million. The last few months have been erratic, but bookings and shipments are balancing out and should remain that way for the rest of the year. Production in the second half will be as good or better than it was in the first half.

Castings, Die—If automotive output holds up, zinc castings should tie the all-time 1955 high (off 11.5 per cent in 1956), and aluminum castings will set a record. Backlogs are holding steady. Production and shipments will exceed last year's, and should tie or beat 1955's figures. Another industry bright spot: Increased use of die-castings in machinery, tools, appliances and office equipment.

Castings, Nonferrous—Business in 1957 should be at least as good as 1956's despite some drops among west coast and New England manufacturers. Backlogs are low but should rise later in the year. Production and shipments will probably hold to 1956 figures. Forecast is that 50 per cent of industry's customers will use more copper-base castings, and 47 per cent more aluminum and magnesium-base castings.

Electric Motors — January and February generally saw more new orders than the first two months of 1956. Industrywise, it's felt

that a horizontal first half will be followed by a second half upsurge. Increasing production is catching up to backlogs which will fall throughout the year. Shipments are going up steadily.

Relays, Resistors—New orders are coming in slowly. But forecasts put 1957 at least on a par with 1956, with a probable 5 per cent increase in dollar volume of sales. Backlogs are down but will rise in the second half. Production is on the upswing. Shipments are down but expected to rise.

Switches — Right now, 1957 is running neck and neck with last year. Year-end prediction sees business at least as good as last year's, possibly a little better. Backlogs will hold steady in the first half, may rise slightly in the second. Production will remain about the same; shipments are expected to increase.

Rubber Goods, Mechanical — In January, rubber consumption hit an all-time peak of 140,090 long tons. Estimated rubber consumption for 1957: A record 1.5 million tons. Business should be better in 1957, but it depends to some extent on how well cars and appliances do. Production is expected to increase; high backlogs should come down. Shipments will go up.

Couplings, Hose—Business will be better this year than last. New orders are a bit higher than those of the year-ago period and are expected to rise. A 2 to 3 per cent production gain will cause backlogs in some firms to fall; others look for a slight backlog increase later in the year. Shipments are on the rise and should continue their upward spiral.

Cylinders, Air & Hydraulic — Business has picked up noticeably in the last four weeks. New orders are expected to go up 15 per cent in 1957 to bring the year's dollar volume of sales to around $500 million. Backlogs, up 10 per cent, are mounting faster than shipments (which are on the increase). Production is rising.

Bearings, Antifriction—The outlook pegs 1957 as good or better than last year. Backlogs have come down slightly but are expected to hold relatively steady throughout the year. Production remains the same. Shipments, now holding steady, may rise slightly later in the year.

Fasteners—New orders are holding at the 1956 level. The second half will depend on how well autos, hardware and appliances move. Generally, the industry believes it will do as well as it did last year when it had around $900 million in sales. Backlogs are steady; production and shipments are holding at about 1956 levels.

Screw Machine Products — New orders are below the 1956 pace. Industrywise, it's expected that business will be down this year. Backlogs are about where they were at the end of 1956 (8.5 weeks) and are expected to hold steady. Both production and shipments have dropped since December.

Springs—New orders are ahead of 1956's and should remain good for the rest of year. Production is going up slowly but not keeping pace with rising backlogs. Shipments have increased and should shoot up in the second half. A 5 to 10 per cent increase in dollar volume of sales is predicted.

Stampings — January's new orders rose 27 per cent over those in January, 1956. The majority look for a 10 per cent increase in business volume in 1957, due in part to the industry's diversification. Backlogs are about what they were in 1956; production is expected to increase 10 per cent by the end of the year.

Gears—New orders are currently running ahead of last year's. Sales for the year should be a shade better than 1956's estimated $250 million because of increased demand from all customer industries. Backlogs have increased slightly, but should decline later in the year. Production remains the same and should hold at this level throughout 1957.

Drop Forgings — Last year's shipments (977,000 tons, worth $694 million) should be exceeded this year. Bookings are ahead of year-ago figures in dollar volume and most probably will remain at a high level for the rest of the year. Shipments are up over what they were a year ago in dollar volume but not in tonnage.

Metals Move West

400 firms exhibit products in Los Angeles show; accent is on aircraft and missiles

YOU CAN'T make the most of a thriving metalworking market if you're 2000 miles away.

This sentiment prevailed in Los Angeles last week as more than 400 firms moved exhibits and technical experts into Pan-Pacific Auditorium and four specially erected pavilions to make the 10th Western Metal Exposition the largest one yet. The majority of exhibitors have their home bases outside the western states. Exhibits were focused on the needs of the aircraft and missile industries—the backbone of western metalworking which has a total yearly sales volume of some $14 billion.

Variety—E. F. Houghton & Co., Philadelphia, concentrated on oils and lubricants for cutting and forming titanium alloys. Kennametal Inc., Latrobe, Pa., compared the superior oxidation resistance of Kentanium (a heat resistant titanium carbide) with a chrome-nickel-cobalt superalloy at 2000°F. Jones & Laughlin Steel Corp., Pittsburgh, showed hot extruded, cold drawn sections in steel and titanium produced in tolerances needed for aircraft applications. Steel City Testing Machine Co., Detroit, operated a ductility tester designed for measuring drawing qualities of thin metals used in aircraft.

Firsts—Sheffield Corp., Dayton, O., demonstrated ultrasonic machines for machining hard and brittle materials such as are used in electronic components. The show also had its share of firsts. Standard Pressed Steel Co., Jenkintown, Pa., introduced a new type of steel lightweight locknut for aircraft applications up to 550°F. Hevi-Duty Electric Co., Milwaukee, showed for the first time a molybdenum tube furnace for testing and research where 3000°F is required. Allegheny Ludlum Steel Corp., Pittsburgh, announced a tool steel called Oilgraph-Ez.

Crucible Steel Co. of America, Pittsburgh, officially opened its Los Angeles specialty steel warehouse and sales office.

Who's Buying Colored Refrigerators?

- 58 per cent of colored refrigerators go into new homes.
- Most colored refrigerators are bought by people who own their own homes.
- Better than half of the housewives buying colored refrigerators are under 40.
- More colored refrigerators are sold in the West and Southwest than in the East and Northeast.
- 83 per cent of the consumers are in the middle and upper income groups.
- 45 per cent have a college degree; 18 per cent have advanced degrees.
- Most buyers are active in social and civic activities and hold managerial, executive and professional type jobs.

They Prefer These Colors

(Based on current sales)

Yellow	35.7 per cent
Pink	35.1 per cent
Brown	12.0 per cent
Green	9.4 per cent
Blue	6.1 per cent
Coppertone	1.7 per cent

Hues Help Hotpoint--but

Colored appliances have brought problems in inventory, production and scheduling that appliance makers never dreamed of. Yet the future looks rosy

ADDING COLOR to appliances may have made the planning of a modern kitchen a housewife's dream, but it has been more like a nightmare to appliance makers.

Take refrigerators. If you have ten different models and offer the buyer a selection of six colors plus white, it takes 70 units just to have one of each. Project that to customer buying preferences, production scheduling and inventorying, and the problems become obvious.

No Easy Answer — When Hotpoint Co., Chicago, moved into colored appliances in 1955, it thought it had a ready answer. With the help of a consultant, it developed a multiple-type color called tusque green which was designed to take on the hue of the colors in its surroundings. The hope was that this would help solve the color problem. Few housewives like it, and the company quickly switched to a program with five colors.

Basically, Hotpoint has only one refrigerator assembly line plus an auxiliary line. It achieved satisfactory model-mix assembly techniques through design: 4 basic cabinets, 6 liners, 9 refrigeration units and 11 doors handle all 10 model requirements.

New System — Adding color meant, first of all, a new painting system—something in which one basic paint line could be flexible enough to handle all colors plus white. A Ramsburg electrostatic system was installed in which changes from one color to another can be made without cleaning the paint bells or stopping the conveyor line. In operation, ten dummy cabinets are placed in the line while the color change is being made.

But production facilities to handle color mix can be made flexible only within economic limits. The key to Hotpoint's whole program is in accurate market forecasting closely co-ordinated with production scheduling.

What Colors?—Forecasting consumer preferences for color without previous experience is like predicting how many games a rookie pitcher will win in the majors this year. Hotpoint's first step was to conduct a study in late '55 and early '56 to determine who was buying colored appliances and what colors they preferred. (See accompanying exhibit.)

William Sanford, supervisor of refrigerator market research and scheduling, admits the early months were a bit hectic: "For example, I thought blue would be one of the most popular colors—probably because it's my favorite color—but it's now running fifth." As colored refrigerator sales increased, the pattern became more predictable.

Scheduling — This is how Hotpoint's system works in practice. Based upon the company's annual projection for the coming year, a five-month scheduling program is set up. This details monthly production of refrigerators by both model and color. Target: To maintain a balanced inventory of refrigerators by both model and color to meet shipping requirements. The inventory averages about five to six weeks' stock at any given time.

In monthly meetings between the marketing and production scheduling executives, revisions are made, if necessary, to schedules and another month's schedule is added. A tentative schedule for five months in advance is always maintained.

At midmonth meetings, the schedule for the following month's production is frozen. All color re-

quirements are programmed for the first two weeks' production operations.

Flexibility—To insure maximum flexibility, weekly meetings are also held. In these, the short term sales outlook can be kept up to date. Any shortcomings in the initial color scheduling of the first two weeks' production can often be corrected by rescheduling in the third and fourth week operations. Sometimes other special situations arise in which rescheduling is necessary and its impact on shipping activities can be evaluated.

"As in all forecasting," says Mr. Sanford, "experience and trend patterns serve as guideposts, but for maximum effectiveness, you have to keep an eye on day-to-day conditions and occasionally even resort to educated hunches."

Evaluation — "Particularly important is the relationship maintained with the field representatives, distributors and dealers," he adds. "The better you know them, the more accurate your forecast will be. For example: Two different representatives may describe their individual prospects as 'exceptionally bright' in coming weeks. From experience with the individuals, you should know that one means he'll probably sell about as many refrigerators as he has been; on the other hand, such an outlook for the other individual probably means he'll increase his sales by as much as 10 per cent."

Hotpoint has a builder sales division and constant checking with this department on possible upcoming sales is important. "Nothing throws our schedule farther off base than a builder order of 100 or more units in one color," says Mr. Sanford. "If we can get a tip that such an order is a possibility, then we can rearrange our schedule so that its impact won't be so great if and when the order materializes."

Other Factors—A watchful eye on general economic conditions is also important. Tightening or easing of credit, home building activity, consumer income and spending often help in determining schedules.

"The impact of color on appliance sales and the necessity for almost daily evaluation of color mix is indicated by Hotpoint's color refrigerator sales curve. In the first six months of 1956, color accounted for 2.8 per cent of all refrigerator sales. By the end of the year, the total was 4.1 per cent. In the first two months of 1957, the figure was 7.5 per cent. Mr. Sanford predicts that within ten years color will account for at least 20 per cent of sales.

Boosts Sales—For all its headaches, appliance makers don't look unkindly toward color's introduction. The industry has long sought a way to stimulate consumers to purchase newer, more modern appliances before the old ones wore out—average life is better than ten years. Color may increase this obsolescence factor. What's more, after the homemaker buys a colored refrigerator, she will often purchase additional colored appliances.

ODM Writes Off Write-Offs

Fast amortization now limited to strict defense and AEC projects. Industry shows little surprise. Expansion plans will go ahead just about as they were scheduled

THE OFFICE of Defense Mobilization's revision of Expansion Goal No. 224, which eliminates fast tax amortization of any facilities except those directly related to defense or to the Atomic Energy Commission, fell on U.S. industry with a quiet phttt.

The revision merely formalizes ODM policy that began last year and became clearly defined with the refusal in December to grant five-year write-offs to 24 steel companies (STEEL, Jan. 14, p. 37).

No Reaction—STEEL found no surprise in the metalworking industry. Steel companies still plan to spend $2.2 billion on the expansion of facilities. Total capital spending for the year is still expected to reach $37.4 billion (STEEL, Mar. 14, p. 53).

"The government should know what it wants," said Ludlow King, of the National Machine Tool Builders' Association. "There has been no indication that it wants to expand machine tool facilities."

Could Change—If ODM decides it needs more machine tool facilities and sets up a special expansion goal, the industry will cooperate to the fullest, Mr. King added.

Roscoe H. Smith, secretary, Reliance Electric & Engineering Co., Cleveland, said: "The new ODM provision will have no effect on our expansion plans. I believe some companies have contracts tied to certificates of necessity, but we do not."

Specifics—Before revision, Goal No. 224 was a kind of catchall. Spelling out elimination of expansion in basic industries (steel, oil, etc.), ODM states that No. 224 now applies only to items, components and materials where there is no "current or currently foreseeable" industrial use.

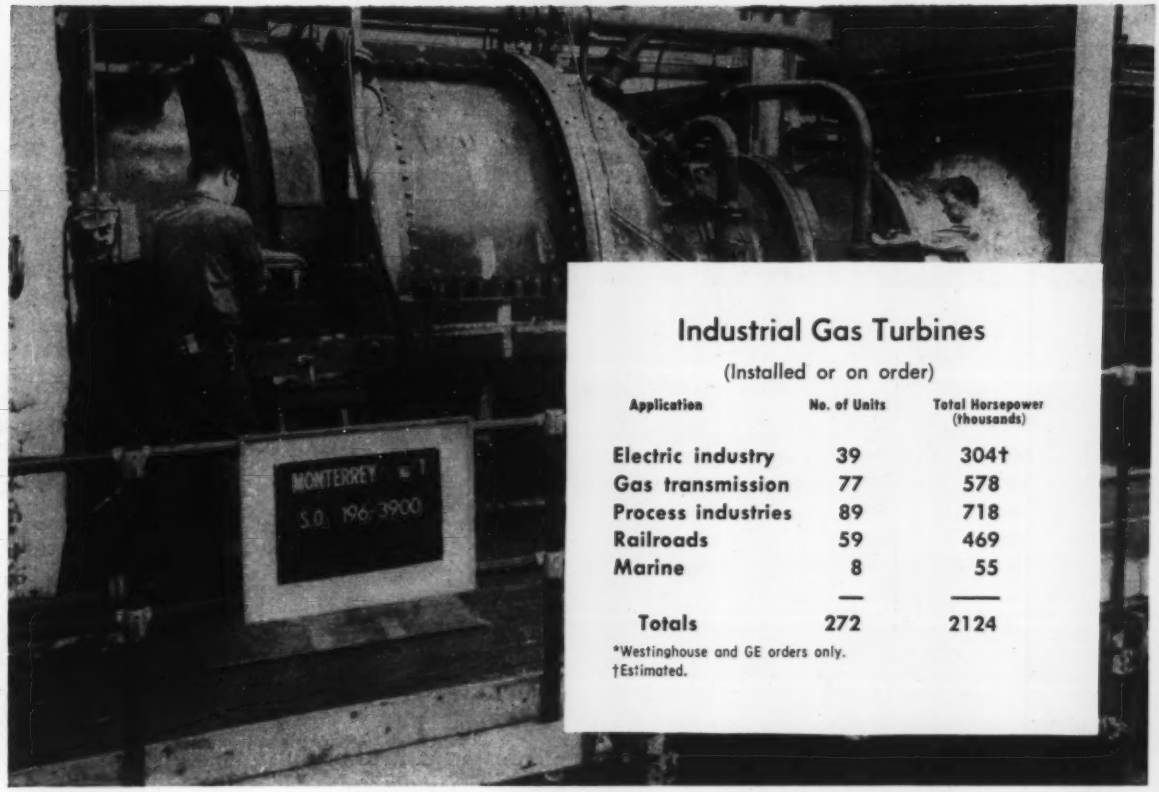
Note the wording: If there is any current or currently foreseeable industrial use for a product, no matter how badly it might be needed by the defense program, there will be no fast tax write-offs for facilities to produce it.

Red Tape—Such items will require special expansion goals. Recently, goals were set for liquid oxygen, the latter limited to defense or AEC facilities.

A special goal has already been set for tankers, but it is almost filled. An ODM spokesman says there is little likelihood of any further expansion for tankers except those leased directly to the government which would fall under military needs.

Total effect: There aren't enough goals left to stick in your eye, comments one insider. This points up the new atmosphere around ODM:

Less government aid to business in general, a la the administration's policy of hands off as much as possible.



Industrial Gas Turbines

(Installed or on order)

Application	No. of Units	Total Horsepower (thousands)
Electric industry	39	304†
Gas transmission	77	578
Process industries	89	718
Railroads	59	469
Marine	8	55
Totals	272	2124

*Westinghouse and GE orders only.
†Estimated.

GE tests this gas turbine for electric power in Mexico

Gas Turbines Tap Steel

CURRENT commentary associates gas turbines with the automotive industry, but industrial gas turbines have been in operation in the U.S. since 1949.

Most of the big ones are pumping gas through pipelines, repressurizing oil fields, or are being used in electric power plants and process industries such as petrochemical plants.

The steel industry is the latest market to be tapped by gas turbine builders.

Blowers—U.S. Steel Corp.'s South Works plant, Chicago, has ordered the industry's first gas turbine blower from Westinghouse Electric Corp., Pittsburgh.

It will be delivered next year. Estimated cost: $2 million — a quarter million less than a steam driven blower of similar capacity.

Definition—In simplest form, the gas turbine operates like this. Compressed air is forced into a fuel combustion chamber. The hot gases from combustion expand through one or more turbine wheels.

This rotates the turbines, providing power to operate compressors, generators and many types of driving power. Exhaust gases can be recovered for re-use.

Big Three—Westinghouse, General Electric Corp., Schenectady, N.Y., and Clark Bros. Co., Olean, N.Y., are ranked as the top gas turbine manufacturers in the U.S.

Their combined 1956 sales of heavy duty industrial gas turbines are estimated at $35 million. A Westinghouse spokesman figures this will increase 10 to 15 per cent in 1957.

Small Jobs—GE and another dozen firms make smaller units (5000 hp and less) for marine engines, aircraft, missiles and railroad locomotives as well as highway vehicles. The sales volume isn't known since much of the work is for defense jobs, but it's at least triple that of the heavy units.

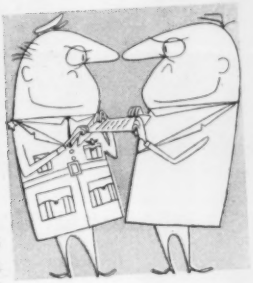
Can't Shrink—Size is a headache facing builders of small turbines. Engineers find that every time they double power, they also tend to double weight.

Wallace E. Skidmore, engineer at Boeing Airplane Co., Seattle, reports that in ten years a turbine developed by his firm has increased output from 120 to 240 hp, but it has become heavier—220 vs. 320 lb.

Good Results — In marine and railroad uses where weight isn't as important, the gas turbine is performing brilliantly.

Another future use for turbines may be to power renovated World War II Liberty ships.

Autos — Performancewise, automotive gas turbine engines are feasible, but mass production costs still have to be lowered. Optimists peg the introduction of gas turbines in cars at 1960. Pessimists feel they won't come before 1975—if then.



Defense Denies Bias Against Small Firms

TALK that the Air Force's weapons system concept is pushing small firms out of business is discounted by Pentagon officials. The charge came up in hearings of Sen. George A. Smathers' (Dem., Fla.) Subcommittee on Government Procurement. The most pointed comment is from H. E. Johnson, president, National Die Casting Corp., who reports weapons parts he once made as a prime contractor are now included as components of a weapons system. When his firm solicits the same work from the new prime contractor who has the weapons system contract, Mr. Johnson says he finds the prime contractor doing the whole job.

Defense and Air Force spokesmen answer that such cases are relatively few. They claim this is what is really happening to small firms' chances of getting defense work in the aircraft and missile fields: 1. There's a dog-eat-dog fight going on between airframe and electronics manufacturers for procurement dollars. 2. If these large firms can make an item themselves, they won't go out of their way to hand subcontracts to smaller firms.

Background: Since the Korean War and the development of a fairly fixed limit on the amount of business available, an increasing amount of the defense budget is going to missiles, aircraft and ships and a decreasing amount to vehicles, ammunition and weapons. Small firms have the least opportunity in the missile, aircraft and ship fields because they lack the capital, organization and equipment to handle the contracts, say Defense spokesmen.

They have been subcontractors in the aircraft field for airframe manufacturers, but they are losing out as a greater percentage of the defense budget goes to missiles. "This is confusing the trend to the weapons system concept with the trend to missiles," comments a high defense official.

Whatever the reasons for the situation, Senator Smathers is hopping mad about it. He wired Defense Secretary Charles E. Wilson: "Should the decline in small business' share of military procurement dollars continue unchecked, in another ten years small firms will be completely out of the picture."

Senator Smathers charges defense procurement personnel are not trying to sell small firms, or are trying but using the wrong methods. Mr. Wilson is looking into the matter, while the senator has fired off two letters to Dudley C. Sharp, assistant secretary of the Air Force, with seven pages of questions he wants answers to. The committee complaint: The AF bolsters its small business figures with subcontracting totals. The subcommittee believes small firms can be prime contractors.

When hearings resume in May or June, expect to hear from Army chiefs of the signal corps, engineers and ordnance. They'll be put on the spot to see if they are following the avowed policies of Defense. Emphasis will be on research and development contracts. About 95 per cent go to big firms now, automatically eliminating production jobs from the small firms, charges Senator Smathers.

Another voice was raised on the House floor last week: Rep. James Roosevelt (Dem., Calif.) charged that the Defense department's new small business advisory committee is loaded with big business representatives. He concludes that the weapons system concept "leaves the task of spreading defense production almost entirely up to the discretion of large contractors."

Adequate Nickel Supply Seen

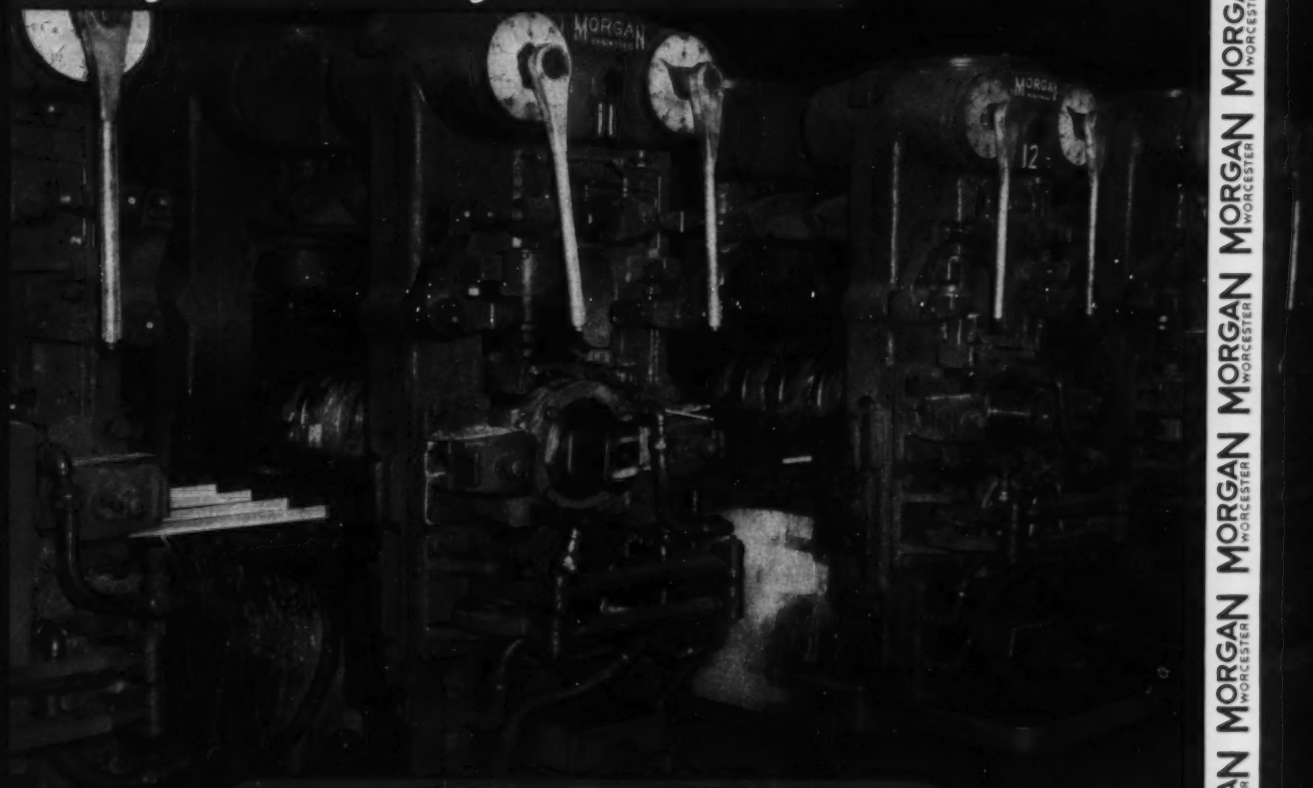
The immediate outlook for nickel is adequate. Tip-off: International Nickel Co.'s Huntington, W. Va., rolling mill has been on strike since Jan. 13, yet no one seems too worried about it in Washington. Under another administration you might have seen the whole staff of the National Labor Relations Board trooping off to Huntington, but not this one. The only negotiators sent in are people from the Philadelphia office.

Says one authoritative source: Supply will equal demand during the second and third quarters. Then, with supplies relatively plentiful, you'll see uses which have been gathering dust taken off the shelf. At that point, nickel will tighten again, but not drastically. This source agrees with the Commerce department's estimate that the metal won't be completely out of the scarce column until 1960-61, but things will become progressively looser up to that time. He guesses: 40 million lb more will be available for military and civilian uses this year—about a 16 per cent increase over last year's figure.

Stockpile Report Is In

The Business & Defense Services Administration's secret report on stockpiles of strategic metals has gone to Congress. Look for a stem-to-stern revamping of the program. The House last week voted an appropriations bill which eliminated the $19 million that had been allocated for stockpiling. The new report probably won't go along with that, but you can expect the stockpiling program to move to new directions. One hint: The rare earths are due for close attention by the military.

Morgan Quality in Action



MORGAN WORCESTER

High Speed Four Strand Rod Mill

Cuyahoga Works, American Steel and Wire Division

UNITED STATES STEEL CORPORATION

Morgan Mills are known to steel men throughout the world for their sound design and accurate manufacture . . . an enviable reputation which has assured mill users of efficient and trouble-free operation. Morgan Mills have kept pace with the ever-increasing demands for high output and greater accuracy of product.

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New Field for Grace

Its Davison division will produce nuclear reactor materials in privately financed, operated plant

BY OCTOBER, the first privately financed and operated plant to produce materials for nuclear reactors will be in operation. Davison Chemical Division, W. R. Grace & Co., Baltimore, describes the operation as the "missing link between the government's supply of raw materials and the fabricators who make finished fuel elements."

Tennessee — Located within 100 miles of Oak Ridge, Tenn., at Erwin, the plant will produce uranium, thorium and rare earths and metals for reactors owned by private enterprise and the Atomic Energy Commission.

J. Peter Grace, president, W. R. Grace, says it's a "logical extension" of Grace's rare earths and thorium operations at Curtis Bay, Md., and Pompton Plains, N. J.

Three in One—The installation will include:

1. Solvent extraction plant producing pure thorium and uranium salt.
2. Reduction plant to convert salt to metal powder or sponge.
3. Melting and casting plant with vacuum induction and arc melting facilities. Besides nuclear uses, thorium is expected to find use in magnesium alloys for jet aircraft and guided missiles.

Essentially a job shop operation, the plant will provide industry with a nucleus of trained personnel for research and development.

Mack Makes Addition

Mack Trucks Inc., New York, has started a $1.5-million addition to its Sidney, O., plant. The construction will provide 143,000 sq ft of floor space and more than treble the present area.

Servomechanisms Builds

A $1-million plant will be built by Servomechanisms Inc., New York, in eastern Nassau county. The 55,000 sq-ft building will house engineering and production operations of the company's Subsystems group.

Clark Equipment Grows

A 300,000 sq-ft Chicago plant is being built by Clark Equipment Co., Buchanan, Mich. Completion is scheduled for June 1.

The company's Construction Machinery Division plant in Benton Harbor, Mich., is being expanded for the fourth time since it was built in 1954. The 63,000 sq-ft addition will be completed in June.

Aircraft Firm Enlarges

A $1-million expansion of United Aircraft Products Inc., Dayton, O., is under way. Purchase of a 90,000 sq-ft plant at Forest, O., doubled the firm's capacity for the production of sheet metal assemblies used by defense industries.

Employment will start with about 150 workers in March and will reach 300 when production is in full swing.

Austenal Swells Facilities

An 85,000 sq-ft plant for the production of investment castings is under construction at La Porte, Ind. Charles H. Prange, president of Austenal Inc., New York, expects the plant to be completed by Sept. 1. Initial employment will be 300.

Air Reduction To Up Output

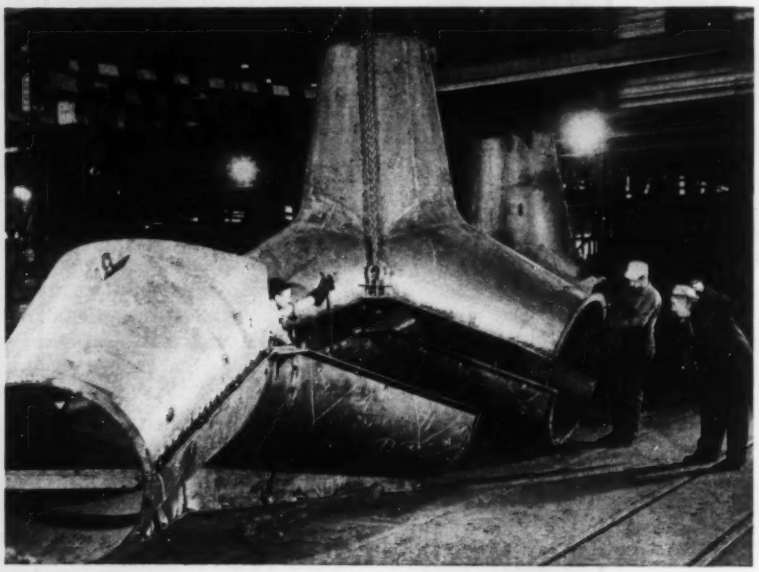
A $7.5-million air separation and liquefaction plant will be completed at Basset, Calif., near Los Angeles, late this year. The plant, being built for Air Reduction Pacific Co., a division of Air Reduction Co., New York, will have a daily production of 55 tons of high purity oxygen, 15 tons of liquid nitrogen and 3½-tons of liquid argon.

New Plant for Sperry-Rand

An electronic flight-control factory is being built near Phoenix, Ariz., by Sperry-Rand Corp., New York. The $1-million building will have 81,000 sq ft of floor space and is scheduled for completion June 10.

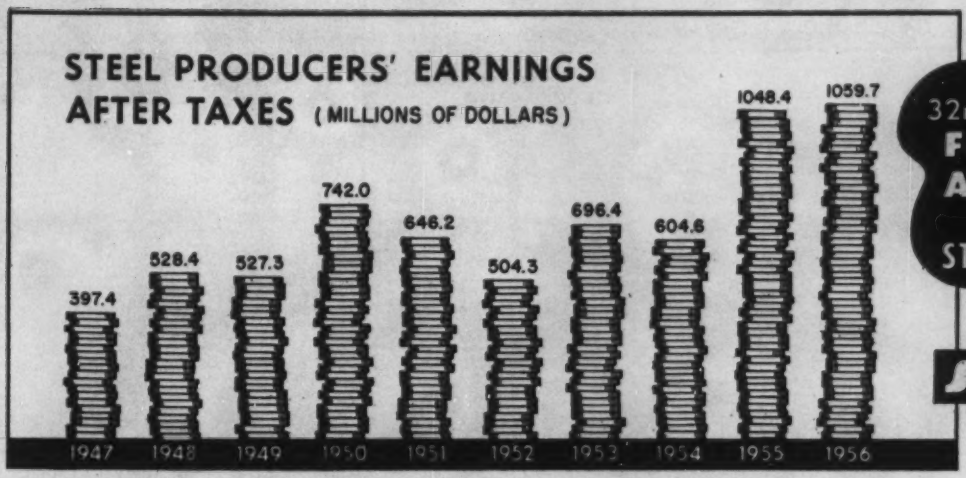
Surface Expands in Southwest

Gas burners will be made at the 43,000 sq-ft plant Surface Combustion Corp., Toledo, O., has built for its Webster Engineering Co. Division in Tulsa, Okla.



Blaw-Knox Fabricates Steel Tetrapod Forms

Tetrapods, said to be the newest idea in breakwater construction in the U.S., can be mass produced from steel forms being fabricated by Blaw-Knox Co., Pittsburgh. The tetrapod is an integrally cast, four-armed block, each arm being attached to a central core. Fundamental advantage of tetrapods is that less rock and concrete are required, which means handling is simplified



32nd ANNUAL FINANCIAL ANALYSIS OF THE STEEL INDUSTRY

Supplement to STEEL

April 1, 1957

Steel Industry's Earnings Set Record

STEEL INDUSTRY earnings set a record in 1956, even though steel production was slightly below the 1955 record.

At $1.14 billion, earnings are 1 per cent above the previous record—1955's $1.12 billion. The industry figure is based on the performance of 33 ingot producers in STEEL's 32nd Annual Financial Analysis of the Steel Industry. These companies represent 93.34 per cent of the nation's ingot capacity. They had net earnings of $1,059,679,049 in 1956, compared with $1,048,429,802 in 1955.

Two-Thirds Earn More

Twenty-two of the 33 companies had larger earnings.

The increase in net earnings came largely from increased prices of steel and efficiencies being realized from new facilities and improved practices. The companies had an 8.6 per cent larger dollar volume of sales in 1956 than in 1955, despite a 1.6 per cent decline in the industry's ingot production. Output was restricted by a six-week strike of steelworkers.

Even though sales and net profits were up in 1956, the federal income tax collector got 3.7 per cent less than he did in 1955. Reasons: Increased costs of labor and material, and fast amortization of facilities under certificates of defense necessity. In 1956, federal income taxes were 4.7 per cent less than the industry's net profit; in 1955, taxes were 0.1 per cent greater than profit. Even so, federal income taxes took $1.01 billion from these companies in 1956. In 1955, they took $1.05 billion.

Although the steel industry as a whole turned out 1.6 per cent less ingot tonnage in 1956 than it did in 1955, some companies set production records. This, along with increased prices, brought records in sales and earnings.

The beneficial effect of new facilities should show up even more in 1957 than in 1956. In 1956, the industry's ingot capacity rose 5.1 million net tons, but some of this didn't come into operation until late in the year. Another addition —6 million tons—is expected to be made in 1957.

Profit on Sales Declines

While the steel industry earned more money in 1956 than it did in 1955, it wasn't able to keep as much of the sales dollar. In 1956, its net profit was 7.28 cents out of every sales dollar, compared with 7.82 cents in 1955.

Growth of the industry and increased rates for overtime work are pushing up its total employment, despite the continued introduction of labor saving equipment. Employment rose 1.4 per cent in 1956 over 1955's. Employment costs jumped 7.7 per cent, even though most of the steel plants were idled six weeks by a strike. Increased wage rates account for this climb. The rise in overtime rates stimulates employers to add enough people so the work can be done without overtime.

Not only are there more employees in the industry, but there are more owners. The number of holders of common stock rose 8.9 per cent last year. In line with the trend to eliminate preferred stock, the number of holders of preferred continued to shrink. The decline in 1956 was 4.4 per cent. The number of common shares outstanding rose 5.2 per cent.

Long Term Debt Is Stationary

The increase in holdings of common stock and heavy reinvestment of earnings by the companies are making it possible for the industry to expand its plant without a heavy increase in borrowing. Long term debt was almost stationary.

Although the industry's net income set a record in 1956, net earnings per share of common stock after allowance for dividend requirements on preferred stock slipped to $6.64 in 1956 from 1955's $6.90. This decline stems from the increase in the number of common shares outstanding.

The industry's current assets and current liabilities showed increases in 1956, but liabilities rose faster. As a result, the ratio of current assets to current liabilities was 2.42 to 1 in 1956, compared with 2.59 to 1 in 1955. Working capital shrank 2.6 per cent.

THIS SPECIAL REPORT is compiled from data from 33 producers representing 93.34 per cent of the steelmaking capacity in the United States

Bold face type is used under those columns in which figures from all 33 companies were not received. NA—Not Available.

	Rated Ingot Capacity, Net Tons		Ingot Production, Net Tons		Steel Operating Rate, Per Cent		Net Income Per Ton Ingots Produced		Ne
	1956	1955	1956	1955	1956	1955	1956	1955	19
United States Steel Corp.	39,582,000	39,215,000	33,402,000	35,309,000	85.20	90.80	$10.42	$10.48	$
Bethlehem Steel Corp.	20,000,000	19,100,000	18,322,308	18,820,912	91.61	98.54	8.81	9.57	
Republic Steel Corp.	11,047,000	10,262,000	9,348,898	9,680,121	91.10[4]	97.10[5]	9.67	8.91	
Jones & Laughlin Steel Corp.	6,600,000	6,166,500	5,997,000	6,190,000	97.25[6]	100.38	7.52	8.09	
Youngstown Sheet & Tube Co.	6,240,000	5,750,000	5,406,016	5,571,556	94.02[9]	100.93[9]	7.99	7.48	
National Steel Corp.	6,000,000	6,000,000	NA	NA	NA	NA	NA	NA	
Armco Steel Corp.	5,950,000	5,150,000	5,220,147	5,099,905	87.73	99.03	12.57	12.62	1
Inland Steel Co.	5,200,000	5,000,000	4,915,576	5,189,509	94.53	103.79	10.78	10.11	1
Colorado Fuel & Iron Corp.[25]	2,471,500	2,471,500	2,401,231	1,936,402	97.16	78.35	6.94	5.62	
Wheeling Steel Corp.	2,130,000	2,130,000	1,994,745	2,057,288	93.65	96.59	8.86	8.41	
Sharon Steel Corp.	1,763,000[22]	1,550,000	1,508,660	1,528,686	85.57	98.62	4.58[23]	5.23	
Kaiser Steel Corp.	1,536,000	1,536,000	1,617,681	1,483,327	105.32	96.57	14.57	5.13	1
Crucible Steel Co. of America	1,423,400	1,351,400	NA	1,222,176	NA	90.44	NA	10.81	
McLouth Steel Corp.	1,380,000	1,380,000	1,372,592	1,125,430	99.46	81.55	6.42	7.24	
Pittsburgh Steel Co.	1,320,000	1,320,000	1,139,882	1,303,503	86.35	98.75	5.46	5.77	
Detroit Steel Corp.	1,290,000	1,290,000	1,032,237	888,443	80.02	68.87	8.47	7.11	
Granite City Steel Co.	1,080,000	1,080,000	1,151,620	1,091,389	106.63	101.05	13.12	11.55	1
Barium Steel Corp.	893,000	893,000	732,600	520,900	82.04	58.33	[17]	[17]	
Allegheny Ludlum Steel Corp.	864,200	864,200	666,918	683,195	77.17	79.06	22.88	21.93	1
Northwestern Steel & Wire Co.[27]	825,000	825,000	692,326	502,443	83.92	60.90	7.33	8.22	
Alan Wood Steel Co.	800,000	625,000	713,859	665,908	109.13[5]	106.55	4.34	3.83	
Lukens Steel Co.[21]	750,000	750,000	703,434	840,690	93.79	94.01	10.67	3.18	1
Copperweld Steel Co.	660,000	618,380	[14]	[14]	[14]	[14]	[14]	[14]	
Lone Star Steel Co.	550,000	550,000	629,579	556,303	114.47	101.15	16.12	8.55	1
Laclede Steel Co.	500,000	500,000	505,575	473,708	101.11	94.74	8.08	8.54	
Keystone Steel & Wire Co.	450,000	425,000	438,364	416,090	97.41	97.90	18.28	21.07	1
Atlantic Steel Co.	400,000	325,068	226,970	251,704	56.74	77.43	3.70	4.36	
Continental Steel Corp.	394,000	394,000	368,059	384,380	93.42	97.56	7.59	7.86	
Rotary Electric Steel Co.	300,000	300,000	222,170	270,283	74.06	90.09	10.34	13.96	
Carpenter Steel Co.[25]	73,667	76,731	73,925	65,315	100.35	85.12	78.46	53.51	7
Universal-Cyclops Steel Corp.	70,160	70,160	63,211	65,668	90.10	93.60	61.33	46.53	5
Eastern Stainless Steel Corp.	50,000	50,000	42,223	30,946	84.45	61.89	53.31	81.79	4
Vanadium-Alloys Steel Co.[25]	42,000	42,000	17,065	11,783	40.63	28.05	140.93	124.16	5
Total (or average)	22,634,927	118,060,939	100,926,871	104,236,963	88.11	93.53	$9.82	$9.57	$

	Number of Shares of Common Stock Outstanding		Common Stock Valuation		Preferred Stock Valuation		Boo
	1956	1955	1956	1955	1956	1955	19
United States Steel Corp.	53,699,617	53,495,274	$894,993,617	$891,587,900	$360,281,100	$360,281,100	$44
Bethlehem Steel Corp.	10,105,462	9,597,127	376,612,630	305,445,730	93,388,700	93,388,700	122
Republic Steel Corp.	15,510,288	15,437,177	155,317,286	154,585,856	None	None	42
Jones & Laughlin Steel Corp.	6,582,742	6,293,770	65,534,000	62,769,000	29,357,000	29,357,000	64
Youngstown Sheet & Tube Co.	3,422,073	3,378,506	109,647,308	106,314,056	None	None	116
National Steel Corp.	7,404,318	7,379,685	74,043,180	73,796,850	None	None	57
Armco Steel Corp.	10,879,827	10,634,112	108,798,267	106,341,123	None	None	39
Inland Steel Co.	5,617,973	5,509,767	100,514,559	93,633,807	None	None	65
Colorado Fuel & Iron Corp.[25]	3,383,559	2,705,671	16,835,119	13,442,248	11,332,649	11,355,664	37
Wheeling Steel Corp.	1,936,029	1,909,780	19,360,290	19,097,800	35,749,600	35,752,600	80
Sharon Steel Corp.	1,100,000	1,100,000	11,060,390	11,060,390	None	None	71
Kaiser Steel Corp.	3,246,500	3,200,000	3,246,500	3,200,000	38,501,625	38,902,250	27
Crucible Steel Co. of America	1,818,228	1,641,162	45,455,719	41,029,064	None	None	61
McLouth Steel Corp.	1,487,000	1,189,600	3,717,500	2,974,000	21,736,100	24,421,150	30
Pittsburgh Steel Co.	1,519,165	1,441,102	15,191,650	14,411,020	24,194,300	24,194,300	43
Detroit Steel Corp.	3,018,932	3,018,932	3,018,932	3,018,932	4,650,582	6,000,000	18
Granite City Steel Co.	2,127,044[11]	2,017,074[11]	26,593,712	25,233,365	2,307,100	4,470,000	35
Barium Steel Corp.	3,533,533	3,227,700	3,533,533	3,227,700	None	None	8
Allegheny Ludlum Steel Corp.	3,781,667	1,777,706	3,781,667	1,777,706	None	4,057,200	26
Northwestern Steel & Wire Co.[27]	2,453,475[31]	817,825	12,267,375	4,089,125	None	None	10
Alan Wood Steel Co.	696,007	675,735	6,960,070	6,757,350	4,839,800	6,017,300	38
Lukens Steel Co.[21]	317,976	317,976	3,179,760	3,179,760	None	None	109
Copperweld Steel Co.	790,601	755,218	3,953,005	3,776,090	3,362,400	4,145,000	36
Lone Star Steel Co.	2,640,000	2,640,000	2,640,000	2,640,000	None	None	14
Laclede Steel Co.	206,250	206,250	4,125,000	4,125,000	None	None	116
Keystone Steel & Wire Co.	1,875,000	1,875,000	2,604,167	2,604,167	None	None	18
Atlantic Steel Co.	389,380	389,380	2,000,000	2,000,000	700,000	700,000	29
Continental Steel Corp.	501,620	501,620	7,018,789	7,018,789	None	None	43
Rotary Electric Steel Co.	772,795	696,700	7,727,950	6,967,000	None	None	27
Carpenter Steel Co.[25]	854,496	427,248	4,272,480	2,136,240	None	None	37
Universal-Cyclops Steel Corp.	498,287	478,261	498,287	478,261	None	None	42
Eastern Stainless Steel Corp.	600,486	580,532	3,002,430	2,902,660	None	None	27
Vanadium-Alloys Steel Co.[25]	508,503	430,651	2,000,000	2,000,000	None	None	27
Total (or average)	153,278,833	145,746,541	$2,099,505,172	$1,983,620,989	$630,400,956	$643,042,264	

[1] Excluding amount maturing within one year.
[2] After federal income taxes but before interest on long-term debt.
[3] Including funded debt due within one year.
[4] Steel operating rate based on capacity of 10,262,000 net tons.
[5] Steel operating rate adjusted.
[6] Steel operating rate based on capacity of 6,166,500 net tons.
[7] Includes set-asides of $3,704,000 in 1956 and $10,300,000 in 1955 for future income taxes.
[8] Excludes $19,097,800 in securities segregated for plant additions.
[9] Steel operating rate based on capacities of 5,750,000 net tons in 1956 and 5,520,000 net tons in 1955.
[10] Includes set-asides of $3,678,500 in 1956 and $2,411,500 in 1955 for future income taxes.

FINANCIAL ANALYSIS O

Net Income Per Ton Ingot Capacity		Capitalization Per Ton Ingot Capacity		Average Number Employed		Total Employment Costs		Long-term Debt[1]		
1956	1955	1956	1955	1956	1955	1956	1955	1956	1955	1956
$8.79	$9.44	$76.02	$73.15	260,646	272,646	$1,680,969,302	$1,614,885,659	$245,023,677	$286,083,534	$1,508,698,089
8.07	9.43	80.42	79.74	152,443	147,054	860,460,026	779,815,730	278,621,000	336,904,500	859,734,079
8.18	8.41	63.21	63.35	68,918	66,083	418,849,780	395,602,510	40,754,784	440,029,724	502,178,924
6.84	8.13	88.09	85.33	40,999	41,001	254,488,000	236,708,000	130,275,000	105,473,000	356,260,000
6.92	7.25	79.82	80.50	31,502	28,262	184,276,768	168,539,739	98,750,000	100,000,000	289,967,204
8.75	8.05	88.72	75.49	29,204	28,889	194,604,451	177,913,219	110,000,000	55,000,000	348,269,165
11.02	12.50	80.72	86.22	32,539	31,216	213,931,903	191,113,133	51,330,000	57,329,355	320,181,532
10.19	10.49	95.72	83.28	28,743	27,908	164,741,277	155,977,609	129,236,200	84,115,800	268,006,937
6.74	4.41	76.55	68.92	22,333	20,652	130,951,508	107,240,055	49,769,000	55,312,000	111,247,882
8.30	8.12	111.01	107.89	14,384	14,075	95,818,498	91,723,355	44,151,900	48,944,800	137,190,408
3.92[23]	5.15	46.92	47.16	8,559	9,061	47,564,306	51,254,718	4,600,000	5,000,000	67,055,800[24]
15.35	4.95	159.62	151.30	10,583	9,311	67,132,000	51,302,000	118,921,921	126,214,970	84,507,507
8.97	9.77	98.68	95.34	16,226	15,359	94,272,419	88,702,910	27,900,732	30,820,447	67,104,069
6.38	5.90	89.30	92.55	3,470	3,098	22,734,588	20,890,913	56,296,000	65,551,000	41,483,329
4.72	5.69	95.39	89.69	10,109	10,108	62,964,261	61,942,833	36,098,763	32,337,763	50,428,252
6.78	4.90	67.98	66.43	5,071	4,548	32,725,863	28,447,007	26,000,000	28,000,000	54,026,855
13.99	11.68	105.41	94.85	4,979	4,732	29,507,522	26,078,590	35,950,000	34,250,000	48,994,100
[17]	[17]	[17]	[17]	6,137	5,700	31,264,156	25,232,959	8,248,027	1,792,634	26,027,074
17.66	17.34	162.79	140.16	14,504	13,925	99,134,045	87,477,993	39,609,900	30,276,000	97,292,414
6.15	5.01	39.97	35.86	3,025	2,677	17,633,021	14,913,355	8,033,769	8,734,777	12,679,706
3.87	4.08	45.90	57.52	3,788	3,388	23,511,115	19,582,767	5,250,000	5,250,000	19,672,716
10.01	2.99	52.79	46.40	5,282	4,768	30,019,842	31,653,750	4,800,000	5,600,000	31,613,924
[14]	[14]	[14]	[14]	4,287	3,972	29,296,941	24,056,982	8,260,000	5,332,000	24,692,578
18.46	8.65	182.50	186.67	4,578	4,180	23,204,700	20,583,573	63,300,000	75,745,068	34,433,570
8.17	8.09	53.67	49.32	3,742	3,470	21,093,467	18,550,517	2,737,705	2,999,915	19,969,856
17.81	20.63	79.02	73.64	2,737	2,582	18,426,840	16,703,862	None	None	32,955,673
2.10	3.38	30.78	36.94	1,917	1,909	10,408,140	10,557,306	None	None	9,613,705
7.09	7.67	61.26	58.18	2,745	2,710	14,127,915	14,020,371	2,200,000	2,400,000	14,917,126
7.66	12.57	85.55	76.60	1,261	1,241	9,094,433	9,349,655	4,461,000	5,021,000	13,477,297
78.74	45.55	430.64	362.90	3,311	3,116	21,499,000	17,513,968	None	None	27,451,143
55.26	43.55	302.78	257.80	3,873	3,862	24,427,774	22,635,273	None	None	20,744,566
45.02	50.62	497.35	290.34	1,232	1,081	9,263,084	7,293,565	8,223,000	None	13,642,133
57.26	34.83	328.08	239.66	1,444	1,078	8,072,462	4,562,625	None	None	11,779,223
$8.64	$8.88	$80.28	$77.77	804,571	793,662	$4,946,469,407	$4,592,826,501	$1,638,802,378	$1,638,518,287	$5,526,285,836

Book Value Per Share of Common Stock		Number of Common Stockholders		Number of Preferred Stockholders		Preferred Dividend Requirements		Net Earnings Per Common Share		Dividends Per Share on Preferred	
1956	1955	1956	1955	1956	1955	1956	1955	1956	1955	1956	1955
$44.76	$41.54	257,997	244,347	65,007	66,628	$25,219,677	$25,219,677	$6.01	$6.45	$7.00	$7.00
122.34	113.86	91,247	84,268	19,621	20,196	6,537,209	6,537,209	15.33	18.09	7.00	7.00
42.39	39.26	90,421	83,063	None	None	None	None	5.83	5.59	None	None
64.08	62.19	43,459	41,526	5,844	5,934	1,468,000	1,468,000	6.63	7.73	5.00	5.00
116.78	107.41	16,595	15,998	None	None	None	None	12.62	12.34	None	None
57.05	53.93	NA	NA	None	None	None	None	7.09	6.54	None	None
39.43	36.36	53,770	50,275	None	None	None	None	6.03	6.05	None	None
65.60	60.31	26,572	23,229	None	None	None	None	9.43	9.52	None	None
37.85	38.31	19,624	14,650	2,293	2,323	615,169	634,034	4.74	3.79	5.25[15]	5.25[15]
80.86	75.98	11,253	9,959	4,726	4,688	1,787,480	1,787,630	8.20	8.12	5.00	5.00
71.02[24]	61.91	8,123	7,578	None	None	None	None	6.28[23]	7.26	None	None
27.03	21.02	6,711	6,957	13,035	13,723	2,257,693	2,280,870	6.57	1.67	1.46	1.46
61.91	59.73	8,786	7,263	None	None	None	None	7.02	8.05	None	None
30.40	31.73	3,991	3,246	2	2	1,349,807	1,417,500	5.01	5.66	2.625	2.625
43.19	42.93	5,001	4,082	2,925	2,999	1,308,150	1,308,150	3.24	4.31	10.50[15]	10.50[15]
18.90	17.12	5,804	4,253	1	1	360,000	55,000	2.78	2.07	1.50	.9167
35.53	31.56	10,911	9,825	1	786	135,253	440,105	7.04	6.03	5.50	5.50
8.37	7.07	11,547	8,750	None	None	None	None	1.98	0.20	None	None
26.73	24.41[30]	18,462	14,950	None	1,262	395	325,906	4.04	4.12[30]	None	4.375
10.16	8.50[32]	1,031	1,023	None	None	None	None	2.07	1.68[32]	None	None
38.27	36.52	1,555	1,417	586	686	282,396	306,433	4.04	3.32	5.00	5.00
09.42	91.82	1,569	1,336	None	None	None	None	23.60	7.05	None	None
36.23	34.56	5,644	5,633	938	1,054	216,036	244,553	4.08	2.81	5.50[15]	5.50[15]
14.04	10.20	10,686	9,530	None	None	None	None	3.84	1.80	None	None
16.82	105.01	1,604	1,563	None	None	None	None	19.81	19.62	None	None
18.97	16.69	4,240	4,092	None	None	None	None	4.27	4.68	None	None
29.83	29.04	2,662	2,536	266	267	45,997	45,997	2.04	2.70	7.00	7.00
43.73	40.91	3,072	2,883	None	None	None	None	5.57	6.02	None	None
27.44	25.78	2,022	1,671	None	None	None	None	2.97	5.41	None	None
37.13	65.17	3,262	3,052	None	None	None	None	6.79	8.18	None	None
42.63	37.82	1,687	1,563	None	None	None	None	7.78	6.39	None	None
27.72	25.01	3,000	1,976	None	None	None	None	3.75	4.36	None	None
27.10	23.37	2,026	1,905	None	None	None	None	4.73	3.40	None	None
....	....	734,334	674,399	115,245	120,549	$41,583,262	$42,071,064	$6.64	$6.90	.....	.....

[1] Excludes 453 shares in 1956 and 1595 shares in 1955 represented by scrip certificates.
[2] Includes set-asides of $4,005,000 in 1956 and $3,926,000 in 1955 for future income taxes.
[3] Plus stock dividend of 3 per cent.
[4] Comparisons would be misleading because company's operations include fabricating plants with no steel ingot capacity.
[5] Includes two classes of preferred stock.
[6] Includes set-asides of $6,100,000 in 1956 and $4,665,000 in 1955 for future income taxes.
[7] Not applicable to company's operations.
[8] Stock dividends of 6 per cent in 1956 and 5 per cent in 1955.
[9] Plus stock dividends of 4 per cent in 1956 and 3 per cent in 1955.

S OF THE STEEL INDUSTRY F

Surplus 1956	Surplus 1955	Total Capitalization 1956	Total Capitalization 1955	Provision For Depreciation, Depletion 1956	Provision For Depreciation, Depletion 1955	Total Income—Per Cent of Capitalization[3] 1956	Total Income—Per Cent of Capitalization[3] 1955	Lo 1956
$1,508,698,089	$1,330,703,051	$3,008,996,483	$2,868,655,585	$277,598,963	$285,199,386	11.82	13.22	$7,666,37
859,734,079	787,236,115	1,608,356,409	1,522,975,045	102,459,454	102,653,998	10.66	12.38	9,973,57
502,176,924	451,511,235	698,248,994	650,126,815	43,059,441	45,472,391	13.13	13.57	1,306,40
356,260,000	328,613,000	581,426,000	526,212,000	37,009,000	37,021,000	8.35	10.19	3,419,00
289,967,204	256,576,715	498,364,512	462,890,771	41,520,330	41,217,490	9.66	10.03	3,252,05
348,269,165	324,115,137	532,312,345	452,911,987	45,344,338	40,235,237	10.26	11.05	2,121,47
320,181,532	280,345,277	480,309,799	444,015,755	33,328,458	33,880,730	14.07	14.95	1,989,08
268,006,937	238,665,494	497,757,696	416,415,101	24,402,114	21,529,968	11.29	13.25	3,185,22
111,247,882	90,215,453	189,184,650	170,325,365	9,268,969	8,025,886	10.08	8.01	2,416,26
137,190,408	126,001,467	236,452,198	229,796,667	16,172,610	15,805,982	8.17	8.16	1,635,11
67,055,800[24]	57,038,561	82,716,190[24]	73,098,951	4,070,287	4,714,399	9.32	11.21	202,79
84,507,507	64,073,903	245,177,553	232,391,123	15,422,210	14,869,046	11.88	5.77	5,567,31
67,104,069	56,998,410	140,460,520	128,847,921	11,349,222	10,733,440	10.06	11.30	1,358,42
41,483,329	34,770,378	123,232,929	127,716,528	6,093,634	5,623,189	9.60	8.95	3,028,54
50,428,252	47,454,143	125,912,965	118,397,226	6,015,006	5,738,065	6.23	7.64	1,617,67
54,026,855	48,674,277	87,696,369	85,693,209	4,340,459	3,854,797	11.81	9.61	1,611,51
48,994,100	38,482,977	113,844,912	102,436,342	5,052,814	5,185,040	14.47	13.90	1,363,45
26,027,074	19,594,852	37,808,634	24,615,186	2,367,920	1,831,350	19.71	3.15	441,01
97,292,414	85,015,015	140,683,981	121,125,921	11,337,277	10,861,722	11.70	13.23	1,193,04
12,670,706	16,761,565	32,971,850	29,585,467	1,321,128	1,240,826	16.59	15.63	393,13
19,672,716	17,922,651	36,722,586	35,947,301	4,676,619	4,378,694	8.89	7.77	167,64
31,613,924	26,016,891	39,593,684	34,796,651	1,813,932	1,993,666	19.63	7.28	266,89
24,692,578	22,321,806	40,267,983	35,574,896	1,668,798	1,602,285	9.30	7.35	304,68
34,433,570	24,282,207	100,373,570	102,667,275	3,979,721	3,909,279	13.90	8.67	3,797,89
19,969,856	17,533,785	26,832,561	24,658,700	1,587,244	1,622,241	15.64	16.89	109,85
32,955,673	28,692,623	35,559,840	31,296,790	1,241,038	1,166,397	22.53	28.02	Non
9,613,705	9,307,507	12,313,705	12,007,507	862,966	717,117	6.81	9.14	Non
14,917,126	13,502,295	24,135,915	22,921,084	1,391,384	1,337,564	11.97	13.64	95,75
13,477,297	10,993,385	25,666,247	22,981,385	1,259,767	1,264,391	9.88	17.40	239,06
27,451,143	25,709,599	31,723,623	27,845,839	1,858,041	1,803,411	18.28	12.55	Non
20,744,566	17,609,015	21,242,853	18,087,276	1,617,104	1,618,773	18.25	16.89	Non
13,642,133	11,614,154	24,867,563	14,516,814	459,799	399,784	9.68	17.43	157,28
11,779,223	8,065,692	13,779,223	10,065,692	319,440	275,789	17.45	14.53	Non
$5,526,285,836	$4,916,418,635	$9,894,994,342	$9,181,600,175	$720,269,487	$717,783,333	11.30	12.07	$58,880,53

idends Per on Preferred 1955	Dividends Per Share on Common 1956	Dividends Per Share on Common 1955	Federal Income Taxes 1956	Federal Income Taxes 1955	Total Assets 1956	Total Assets 1955	Current Assets 1956	Current Assets 1955
$7.00	$2.70	$2.30	$331,000,000	$366,000,000	$3,836,250,453	$3,620,360,616	$1,325,930,935	$1,343,139,2
7.00	8.50	7.25	147,000,000	181,000,000	2,089,998,212	1,998,652,454	1,076,538,499	1,202,487,0
None	2.625	2.50	94,700,000	84,000,000	857,310,086	764,474,465	382,706,759	353,421,8
5.00	2.50	2.25	39,380,000[7]	46,500,000[7]	1,113,747,000	1,007,736,000	272,323,000	268,266,0
None	4.50	3.75	36,864,048[10]	41,867,500[10]	620,608,608	573,454,851	326,463,097	315,762,9
None	4.00	3.25	47,000,000	48,275,000	674,747,113	591,331,493	247,091,459	227,671,6
None	2.55	1.95	62,297,199	66,613,787	612,828,489	563,097,135	308,025,615	289,244,7
None	4.25	4.25	55,142,000	53,050,000	572,216,740	513,758,850	272,267,488	256,090,3
5.25[15]	1.875	1.10[28]	16,891,800[29]	10,681,800[29]	257,656,529	223,241,515	125,435,222	108,277,3
5.00	3.10	3.00	18,630,000	18,480,000	289,437,176	279,126,243	123,516,416	115,540,9
None	3.00	2.50	6,122,000	7,840,000	108,826,754	92,597,654	61,226,130	52,900,6
1.46	.40	.40	12,055,000[34]	7,145,000[34]	292,572,644	265,767,978	84,335,778	63,837,1
None	3.00	2.50	12,910,000	15,570,000	171,783,932	163,113,209	87,361,212	79,528,7
2.625	[33]	None	9,110,000	7,375,000	166,931,509	160,801,904	54,507,552	46,119,0
10.50[15]	1.00[19]	.25[19]	6,235,000[20]	7,321,000[20]	159,200,328	153,255,428	61,279,308	58,180,8
.9167	1.00	.25	9,015,000	6,715,966	113,936,803	106,137,157	39,116,694	36,243,2
5.50	2.50	2.00	15,800,000[12]	13,703,700[12]	158,846,743	140,465,253	61,122,501	55,153,9
None	[18]	[18]	8,118,951	995,255	63,768,165	53,358,950	34,540,593	24,654,7
4.375	1.70	1.17[30]	16,867,000	16,554,000	182,907,662	163,816,319	101,609,908	88,833,8
None	.403	.167[32]	5,760,000	4,610,000	41,670,460	37,754,885	14,198,279	13,582,3
5.00	1.40[13]	1.40[13]	2,024,000	1,619,000	47,385,882	43,859,941	16,309,704	14,618,0
None	6.00	2.00	7,675,000	3,302,500	50,146,609	44,273,726	29,476,965	24,959,0
5.50[15]	2.00	1.70	4,220,000	2,990,000	56,205,642	43,490,950	31,682,521	26,126,1
None	None	None	11,000,000[16]	4,665,000[16]	123,689,511	121,975,719	42,016,032	39,008,5
None	8.00	6.00	4,575,000	4,700,000	33,225,485	29,542,694	19,604,906	18,549,9
None	2.00	2.00	7,993,443	8,830,268	44,140,949	37,774,159	19,524,046	19,663,8
7.00	1.25	1.09	910,114	1,205,818	23,666,831	17,922,630	9,421,802	9,086,6
None	2.75	3.00	2,810,000	2,760,000	29,301,027	27,625,142	15,199,375	14,072,3
None	2.00	2.00	2,357,000	4,150,000	33,162,994	27,338,590	16,787,307	16,313,6
None	2.25	3.25	6,197,000	3,630,000	42,662,418	35,713,796	26,729,572	21,026,7
None	2.50	2.50	4,387,000	3,135,000	31,404,855	26,783,439	20,362,955	17,302,1
None	1.50	1.125	2,385,000	2,830,000	32,227,515	21,126,781	24,273,768	17,153,3
None	2.00	1.80[26]	2,606,000	1,265,000	18,948,958	12,869,530	11,878,060	8,044,2
.....	....	....	$1,010,037,555	$1,049,380,594	$12,951,414,082	$11,962,599,456	$5,342,863,458	$5,244,861,1

[3] Includes set-asides of $3,108,000 in 1956 and $3,228,000 in 1955 for future income taxes.

[4] 1955 figures represent 52 weeks ended Dec. 31 except for steel operating rate, net income per ton ingot capacity, total income-per cent of capitalization, and net income per common share, which are figured on a 52-week basis.

[5] Does not include 135,000 tons completed in December, 1956.

[6] Does not include capital gain of $6,411,709 from sale properties and securities.

[7] Includes capital gain of $6,411,709 from sale of propert and securities.

FOR 1956

Compiled by STEEL

April 1, 1957

Interest on Long-term Debt 1955	Net Sales 1956	Net Sales 1955	Net Profit—Per Cent of Net Sales 1956	Net Profit—Per Cent of Net Sales 1955	Net Income 1956	Net Income 1955	
,374	$9,071,803	$4,228,877,241	$4,097,680,287	8.23	9.03	$348,098,916	$370,099,353	United States Steel Corp.
,576	8,368,132	2,343,478,150	2,114,599,636	6.89	8.52	161,411,625	180,191,708	Bethlehem Steel Corp.
,404	1,939,455	1,244,214,346	1,188,559,765	7.27	7.26	90,406,665	86,271,491	Republic Steel Corp.
,000	3,541,000	742,642,000	696,538,000	6.08	7.19	45,122,000	50,104,000	Jones & Laughlin Steel Corp.
,055	3,225,000	684,041,021	626,232,840	6.31	6.66	43,174,587	41,701,140	Youngstown Sheet & Tube Co.
,470	1,759,202	664,251,090	622,018,919	7.90	7.76	52,502,422	48,289,453	National Steel Corp.
,083	2,045,660	761,800,102	692,683,234	8.61	9.29	65,593,182	64,350,609	Armco Steel Corp.
,221	2,701,727	731,767,967	663,317,374	7.24	7.91	52,998,726	52,466,098	Inland Steel Co.
,261	2,761,888	341,630,224	257,543,050	4.88	4.23	16,662,653	10,887,163	Colorado Fuel & Iron Corp.[25]
,119	1,460,221	259,554,918	249,445,016	6.81	6.93	17,672,276	17,295,711	Wheeling Steel Corp.
,796	204,608	180,044,408	173,095,949	3.48	4.61	6,905,530[23]	7,987,622	Sharon Steel Corp.
,311	5,803,118	201,692,305	155,595,951	11.69	4.89	23,571,852	7,610,843	Kaiser Steel Corp.
,427	1,352,203	264,614,703	238,175,404	4.82	5.55	12,767,625	13,208,602	Crucible Steel Co. of America
,545	3,280,401	163,906,619	144,987,476	5.37	5.62	8,806,258	8,148,342	McLouth Steel Corp.
,670	1,534,345	179,133,961	177,707,556	3.48	4.23	6,225,000	7,515,470	Pittsburgh Steel Co.
,517	1,916,617	123,616,057	101,898,889	7.08	6.20	8,747,092	6,317,860	Detroit Steel Corp.
,456	1,625,920	137,131,233	116,293,657	11.02	10.84	15,109,411	12,610,820	Granite City Steel Co.
,018	120,545	119,536,637	75,084,700	5.86	0.87	7,009,956	655,319	Barium Steel Corp.
,043	1,042,988	287,078,052	255,587,054	5.32	5.86	15,261,090	14,985,660	Allegheny Ludlum Steel Corp.
,134	490,787	74,157,804	51,403,405	6.85	8.04	5,076,959	4,131,969	Northwestern Steel & Wire Co.[27]
,646	242,222	69,330,353	58,375,609	4.47	4.37	3,095,727	2,551,530	Alan Wood Steel Co.
,892	349,353	105,173,925	97,641,729	7.14	2.74	7,504,889	2,672,770	Lukens Steel Co.[21]
,688	248,138	100,541,926	78,490,150	3.42	3.01	3,440,872	2,365,459	Copperweld Steel Co.
,893	4,138,778	88,650,577	74,489,168	11.45	6.39	10,151,363	4,759,086	Lone Star Steel Co.
,856	118,283	66,509,030	58,191,338	6.14	6.95	4,086,071	4,047,053	Laclede Steel Co.
one	None	66,629,700	62,020,363	12.03	14.14	8,013,050	8,768,519	Keystone Steel & Wire Co.
one	None	28,765,487	28,729,529	2.92	3.82	838,920	1,097,343	Atlantic Steel Co.
,750	103,250	46,703,332	44,881,747	5.98	6.73	2,793,574	3,022,143	Continental Steel Corp.
,051	221,190	53,650,698	54,370,322	4.28	6.94	2,297,587	3,772,074	Rotary Electric Steel Co.
one	None	61,635,127	43,999,585	9.41	7.94	5,800,400	3,495,065	Carpenter Steel Co.[25]
one	None	58,126,507	51,395,521	6.67	5.95	3,876,826	3,055,661	Universal-Cyclops Steel Corp.
281	None	50,092,013	37,946,446	4.49	6.67	2,250,944	2,530,933	Eastern Stainless Steel Corp.
one	None	23,156,558	14,250,562	10.39	10.27	2,405,001	1,462,933	Vanadium-Alloys Steel Co.[25]
,537	$59,666,834	$14,552,134,071	$13,403,230,231	7.28	7.82	$1,059,679,049	$1,048,429,802	Total (or average)

	Current Liabilities[2] 1956	Current Liabilities[2] 1955	Ratio of Current Assets to Current Liabilities 1956	Ratio of Current Assets to Current Liabilities 1955	Working Capital 1956	Working Capital 1955	
9,271	$722,191,907	$647,997,947	1.84—1	2.07—1	$603,739,028	$695,141,324	United States Steel Corp.
7,089	392,712,169	392,492,614	2.74—1	3.06—1	683,826,330	809,994,475	Bethlehem Steel Corp.
1,840	137,769,347	97,291,424	2.78—1	3.63—1	244,937,412	256,130,416	Republic Steel Corp.
6,000	118,540,000	102,936,000	2.30—1	2.61—1	153,783,000	165,330,000	Jones & Laughlin Steel Corp.
2,970	105,637,806	97,658,481	3.09—1	3.23—1	220,825,291	218,104,489	Youngstown Sheet & Tube Co.
1,610	106,380,210	104,151,048	2.32—1	2.19—1	140,711,249	123,520,562	National Steel Corp.
4,766	116,700,328	106,442,417	2.64—1	2.72—1	191,325,287	182,802,349	Armco Steel Corp.
0,367	67,486,297	90,195,217	4.03—1	2.84—1	204,781,191	165,895,150	Inland Steel Co.
7,397	54,321,373	41,573,797	2.31—1	2.60—1	71,113,849	66,703,600	Colorado Fuel & Iron Corp.[25]
0,311	41,060,843	39,098,240	3.01—1	2.96—1	82,455,573[8]	76,442,071[8]	Wheeling Steel Corp.
0,692	26,110,564	19,498,703	2.34—1	2.71—1	35,115,566	33,401,989	Sharon Steel Corp.
7,168	31,195,091	20,434,538	2.70—1	3.12—1	53,140,687	43,402,630	Kaiser Steel Corp.
8,779	26,958,935	30,343,039	3.24—1	2.62—1	60,402,277	49,185,740	Crucible Steel Co. of America
9,078	27,971,580	23,658,376	1.95—1	1.95—1	26,535,972	22,460,702	McLouth Steel Corp.
0,817	21,802,363	26,481,202	2.81—1	2.20—1	39,476,945	31,699,615	Pittsburgh Steel Co.
3,284	14,740,434	12,968,948	2.65—1	2.79—1	24,376,260	23,274,336	Detroit Steel Corp.
3,998	24,283,959	21,977,410	2.52—1	2.51—1	36,838,542	33,176,588	Granite City Steel Co.
4,781	18,067,488	16,370,378	1.91—1	1.51—1	16,473,105	8,284,403	Barium Steel Corp.
3,861	39,849,286	40,112,371	2.55—1	2.21—1	61,760,622	48,721,490	Allegheny Ludlum Steel Corp.
2,383	3,008,610	3,808,418	4.72—1	3.57—1	11,189,669	9,773,965	Northwestern Steel & Wire Co.[27]
8,021	9,063,097	6,513,454	1.80—1	2.24—1	7,246,607	8,104,567	Alan Wood Steel Co.
9,035	8,496,925	8,813,075	3.47—1	2.83—1	20,980,040	16,145,960	Lukens Steel Co.[21]
6,163	15,415,901	7,524,382	2.06—1	3.47—1	16,266,620	18,601,781	Copperweld Steel Co.
8,574	8,758,725	11,510,000	4.80—1	3.39—1	33,257,307	27,498,574	Lone Star Steel Co.
9,922	5,955,424	4,483,994	3.29—1	4.14—1	13,649,482	14,065,928	Laclede Steel Co.
3,830	8,581,109	6,477,369	2.28—1	3.04—1	10,942,937	13,186,461	Keystone Steel & Wire Co.
6,645	5,470,655	3,283,844	1.72—1	2.77—1	3,951,147	5,802,801	Atlantic Steel Co.
2,364	3,963,947	3,529,535	3.83—1	3.99—1	11,235,428	10,542,829	Continental Steel Corp.
3,659	7,496,747	8,120,858	2.24—1	2.01—1	9,290,560	8,192,801	Rotary Electric Steel Co.
8,723	10,931,793	7,861,566	2.45—1	2.67—1	15,797,779	13,165,157	Carpenter Steel Co.[25]
2,183	10,162,002	8,696,163	2.00—1	1.99—1	10,200,953	8,606,020	Universal-Cyclops Steel Corp.
3,369	7,359,952	6,609,967	3.30—1	2.60—1	16,913,816	10,543,402	Eastern Stainless Steel Corp.
4,209	5,169,735	2,803,838	2.30—1	2.87—1	6,708,325	5,240,371	Vanadium-Alloys Steel Co.[25]
1,159	$2,203,614,602	$2,021,718,613	2.42—1	2.59—1	$3,139,248,856	$3,223,142,546	Total (or average)

956.
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erties

[2] Fiscal year ended June 30.
[3] Plus 2 per cent stock dividend.
[7] Fiscal year ended July 31.
[8] Plus 2.5 per cent stock dividend.
[9] Includes set-asides of $1,289,200 in 1956 and $1,411,800 in 1955 for future income taxes.
[20] Adjusted to reflect a 2-for-1 stock split.
[21] Reflects a 3-for-1 stock split.
[23] Based on 2,453,475 shares.
[25] 25 per cent stock dividend.
[24] Includes set-asides of $4,955,000 in 1956 and $4,995,000 in 1955 for future income taxes.

New Field for Grace

Its Davison division will produce nuclear reactor materials in privately financed, operated plant

BY OCTOBER, the first privately financed and operated plant to produce materials for nuclear reactors will be in operation. Davison Chemical Division, W. R. Grace & Co., Baltimore, describes the operation as the "missing link between the government's supply of raw materials and the fabricators who make finished fuel elements."

Tennessee — Located within 100 miles of Oak Ridge, Tenn., at Erwin, the plant will produce uranium, thorium and rare earths and metals for reactors owned by private enterprise and the Atomic Energy Commission.

J. Peter Grace, president, W. R. Grace, says it's a "logical extension" of Grace's rare earths and thorium operations at Curtis Bay, Md., and Pompton Plains, N. J.

Three in One—The installation will include:

1. Solvent extraction plant producing pure thorium and uranium salt.
2. Reduction plant to convert salt to metal powder or sponge.
3. Melting and casting plant with vacuum induction and arc melting facilities. Besides nuclear uses, thorium is expected to find use in magnesium alloys for jet aircraft and guided missiles.

Essentially a job shop operation, the plant will provide industry with a nucleus of trained personnel for research and development.

Mack Makes Addition

Mack Trucks Inc., New York, has started a $1.5-million addition to its Sidney, O., plant. The construction will provide 143,000 sq ft of floor space and more than treble the present area.

Servomechanisms Builds

A $1-million plant will be built by Servomechanisms Inc., New York, in eastern Nassau county. The 55,000 sq-ft building will house engineering and production operations of the company's Subsystems group.

Clark Equipment Grows

A 300,000 sq-ft Chicago plant is being built by Clark Equipment Co., Buchanan, Mich. Completion is scheduled for June 1.

The company's Construction Machinery Division plant in Benton Harbor, Mich., is being expanded for the fourth time since it was built in 1954. The 63,000 sq-ft addition will be completed in June.

Aircraft Firm Enlarges

A $1-million expansion of United Aircraft Products Inc., Dayton, O., is under way. Purchase of a 90,000 sq-ft plant at Forest, O., doubled the firm's capacity for the production of sheet metal assemblies used by defense industries.

Employment will start with about 150 workers in March and will reach 300 when production is in full swing.

Austenal Swells Facilities

An 85,000 sq-ft plant for the production of investment castings is under construction at La Porte, Ind. Charles H. Prange, president of Austenal Inc., New York, expects the plant to be completed by Sept. 1. Initial employment will be 300.

Air Reduction To Up Output

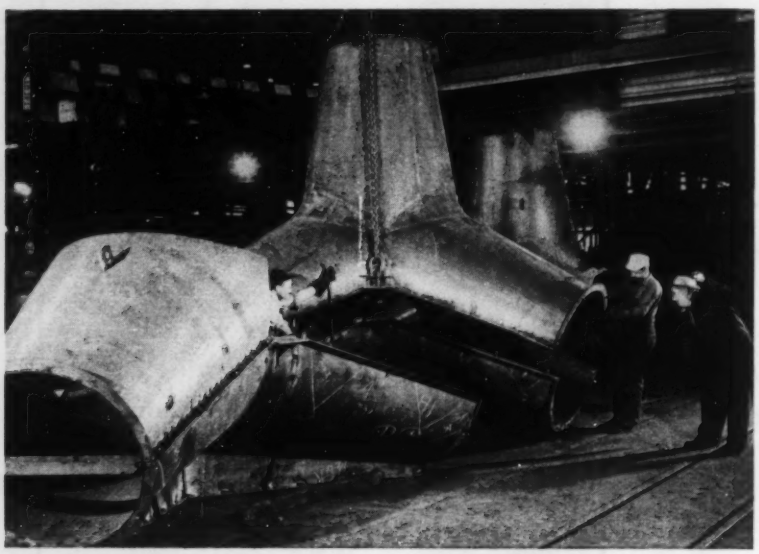
A $7.5-million air separation and liquefaction plant will be completed at Basset, Calif., near Los Angeles, late this year. The plant, being built for Air Reduction Pacific Co., a division of Air Reduction Co., New York, will have a daily production of 55 tons of high purity oxygen, 15 tons of liquid nitrogen and 3½-tons of liquid argon.

New Plant for Sperry-Rand

An electronic flight-control factory is being built near Phoenix, Ariz., by Sperry-Rand Corp., New York. The $1-million building will have 81,000 sq ft of floor space and is scheduled for completion June 10.

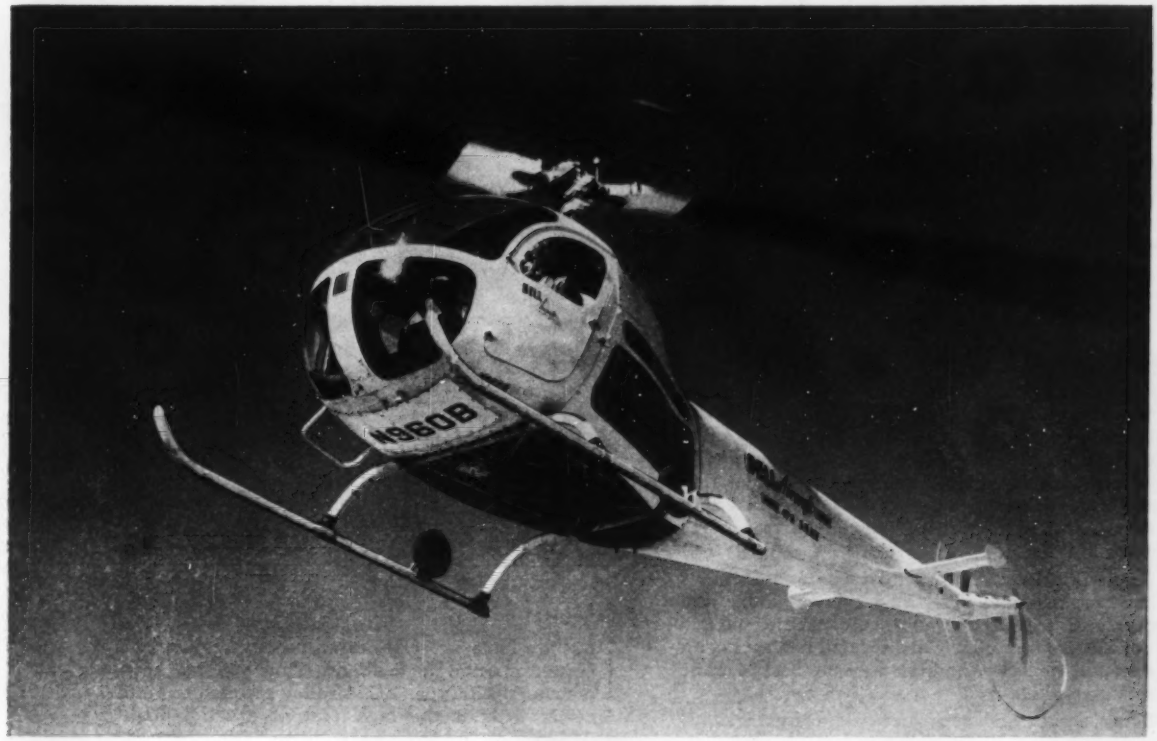
Surface Expands in Southwest

Gas burners will be made at the 43,000 sq-ft plant Surface Combustion Corp., Toledo, O., has built for its Webster Engineering Co. Division in Tulsa, Okla.



Blaw-Knox Fabricates Steel Tetrapod Forms

Tetrapods, said to be the newest idea in breakwater construction in the U.S., can be mass produced from steel forms being fabricated by Blaw-Knox Co., Pittsburgh. The tetrapod is an integrally cast, four-armed block, each arm being attached to a central core. Fundamental advantage of tetrapods is that less rock and concrete are required, which means handling is simplified



Bell Aircraft Corp.

Helicopter Orders Soar

Deliveries lag sales as suppliers of parts step up production. Civilian uses grabbing a bigger chunk of the market. Backlogs now total $500 million

NEW civilian and military applications are putting helicopter production into a vertical climb.

At the beginning of the year, 12 principal manufacturers held unfilled orders worth $500 million, says D. R. Mockler, director, Helicopter Council, Aircraft Industries Association of America.

Metalworking is in on the ground floor of this activity. Component producers and subcontractors who supply parts are sharing in the bonanza.

Overseas — "Foreign uses rose rapidly in the past year," says an exporting firm, Aircraft Dynamics Corp., New York. "European air forces and commercial transportation firms are using much American equipment."

Vertol Aircraft Corp., Morton, Pa., has this to say about military uses: "Recent tests show that long-range flights are feasible and that aerial refueling techniques are effective."

At Home — The armed forces have recognized the merits of the whirlybird for several years. Current enthusiasm stems from the rapid expansion of civilian uses. Examples: Workers and materials are being ferried to offshore oil drilling sites; air line passengers are being flown to and from airports and downtown areas; photographers use them for aerial work.

"We expect civilian uses to continue climbing," say sales executives of Bell Aircraft Corp., Buffalo. That firm's helicopter sales totaled $56 million in 1956. More than 10 per cent were to commercial firms, a gain of almost 50 per cent over 1955 dollar volume.

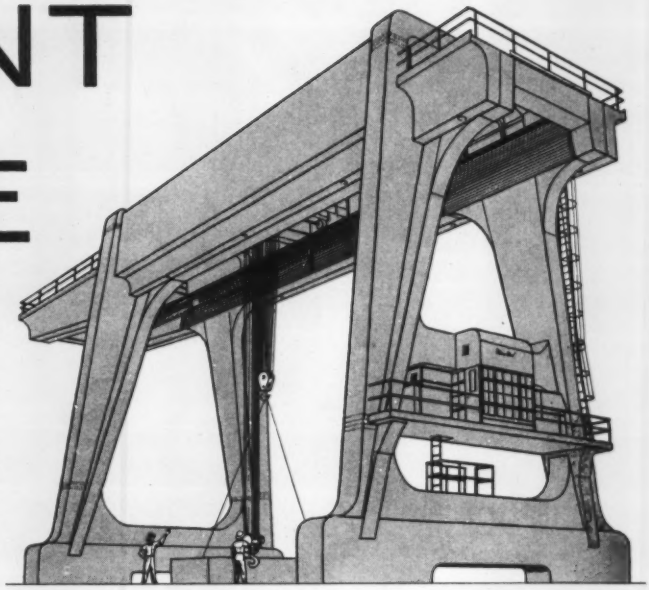
More Room — Some helicopter manufacturers ask suppliers to furnish all parts. They concentrate on research and development and assembly. Parts supplied range from landing gears to motors. Despite the number of new firms springing up on plant sites in the California, New England and Philadelphia areas, there's probably plenty of room for more. Says a spokesman for Sikorsky Aircraft Division, United Aircraft Corp., Bridgeport, Conn.: "In this area alone, we have more than 275 direct machining subcontractors. Although we have many suppliers, if a firm can offer us a better product at competitive prices, it can sell to us."

How does a subcontractor break into the business? Advises Sikorsky: "Develop a good product. Then knock on doors!"

A leading subcontractor, Wellman Bronze & Aluminum Co., Cleveland, began supplying mag-

GIANT CRANE

FOR A GIANT'S JOB

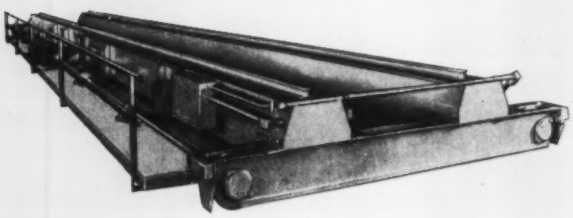


Built for a large hydro-electric power company, this giant gantry crane simplifies turbine overhaul and other equipment maintenance problems. It has a span of 70 feet. Total length is 122 feet and the height is 51½ feet. The two main hoists have a capacity of 80 tons each; the two auxiliary hoists 25 tons each. Twenty-three flat cars were required to transport the massive components to the site.

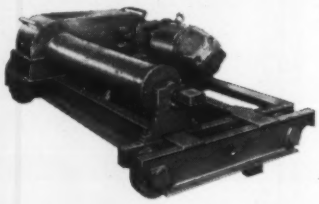
Shaw-Box know-how, experience and facilities have created and built all kinds of gantry and overhead traveling cranes in capacities to and beyond 400 tons. They are serving and saving all over the world—wherever only the best in crane service will do.

Many design and construction features first introduced by Shaw-Box are now accepted as standard by the industry. The Type "SC" Crane shown here is one of the latest Shaw-Box innovations in cranes of 5 to 20 tons for general industrial service. It combines the preferences of thousands of crane users. Advanced standardization and assembly techniques reduce the initial investment. The trolleys are standard units, but we have *pre-engineered* most variations for certain specific applications. Thus you can have a customized Type "SC" Trolley adapted to your needs without the high cost of a tailor-made design.

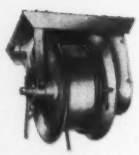
These widely different examples of Shaw-Box engineering typify the forward thinking that makes our cranes widely preferred by engineers and operators alike. Our engineers will gladly work with yours to assure you of the ultimate in crane performance, economy and safety. We invite your inquiry.



Typical Type "SC" Crane Bridge. Note the double web box section girders. No whipping or skewing even under the severest conditions. Direct drive bridge machinery has anti-friction bearings, gearing that operates in oil, and rotating wheel axles for smooth operation and longer life.



The Type "SC" Trolley has a higher hook lift than other unmodified standard top-running trolleys. It provides true vertical lift. The hoist mechanism is precision built for long, quiet operation and little maintenance. Two brakes hold and control the load safely.



"Shaw-Box" Cable Reel. A rugged, efficient mechanism that automatically keeps insulated conductor cable taut on crane and hoist magnets, on soaking pit carriages, mill machinery and machine tools. Spring cannot break.

"Shaw-Box"® CRANES

57E-5

MAXWELL MANNING & MOORE INC. M&M TRADE MARK

MANNING, MAXWELL & MOORE, INC.

SHAW-BOX CRANE & HOIST DIVISION

384 West Broadway • Muskegon, Michigan

Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Other Divisions produce 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves. 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

In Canada: *Manning, Maxwell & Moore of Canada, Ltd., Avenue Road, Galt, Ontario.*

nesium and aluminum castings in 1952. They are used for transmissions, control systems and air-cooled motors. D. T. Wellman, president, says: "These parts require the most difficult quality controlled casting operation we perform. Highest quality is essential."

Boom — Makers of components have a substantial interest in this market. Cleveland Pneumatic Tool Co., Cleveland, reports its sales of landing gears are growing and "show a promising future."

Steel Products Engineering Co., a division of Kelsey-Hayes Wheel Co., at Springfield, O., supplies transmissions. The firm's sales manager comments: "Helicopter production is a tremendous field now, and it's growing both in amount of equipment needed and in number of manufacturers."

Demand Mounts—R. C. Barbato, president, Lundy Mfg. Corp., Long Island City, N. Y., says: "Need is growing for valves and fractional horsepower motors which we furnish to helicopter producers."

Adds J. H. Stephens, partner, Aircraft Products Co., Bridgeport, Pa.: "As supplier of hydraulic valves for helicopter producers, we believe the industry will have an excellent future in both military and civilian uses."

More Metal—The industry is increasing its consumption of steel and aluminum. Officials of Aluminum Co. of America, Pittsburgh, say several million pounds of aluminum are used each year in helicopter manufacture—for frames, skins, fuselages and rotor blades. Vertol says it uses steel in transmission and drive systems, rotor hubs and rotor blades.

Quebec Ups Production

More than $15 million will be spent by Quebec Iron & Titanium Corp. (a subsidiary of Kennecott Copper Corp., New York) to enlarge its processing plant at Sorel, Que. Production facilities will be increased more than 50 per cent.

McCulloch Expands in Canada

McCulloch of Canada Ltd., a subsidiary of McCulloch Motors Corp., Los Angeles, will complete a $2.5-million plant in Toronto, Ont., in September.

Anglo-U.S. Venture Booms

American capital boosted English office machine industry to gross of $152 million last year; British firms ride along in this rapidly expanding market

ANGLO-AMERICAN enterprise in the office machine industry is saving Britain $56 million annually in its balance of trade, reports *Anglo-American News.*

The publication quotes a London stockbrokerage firm's survey showing that the industry grossed $152 million in 1956, of which half was from U.S. owned firms in England.

American Aid—The rapid expansion of the office machine industry in Britain since World War II is shown by exports which grew from $11.2 million in 1949 to $44.8 million by 1956. The survey says that 75 per cent of postwar capital investment came from the U.S.

Last year, the survey states, American firms had a minimum of $48,266,800 in assets in office machine plants, sales organizations and equipment in England. After taking no profits for several years, they received a total return of $14,136,800 last year.

Big Four—Profits were divided: Remington Rand Division of Sperry Rand Corp., $5,994,800; Burroughs Corp., $3,948,000; National Cash Register Co., $2.5 million; Addressograph-Multigraph Corp., $1,694,000. Figures were not available for International Business Machines Corp., which also has large investments.

The Socialist government in Britain allowed U.S. firms to come in with the understanding that a large part of their output would be exported to save Britain dollar imports.

Enough for All — Despite the competition, enormous capital and know-how of U.S. owned firms, British companies flourished in the rapidly expanding market. Many have formed groups for marketing and research and are growing along with the U.S. subsidiaries.

The survey indicates that the U.S. owned share of the British industry will become greater. But most of this production will be for export. Since clerks make up one-sixth of the British population, there are high expectations for continued sales on the home market.

British Seek U. S. Market

British industry is stepping up its efforts to get into the American market. About 150 of that nation's firms plan to display their wares at the U.S. World Trade Fair at the New York Coliseum Apr. 14-27.

Products ranging from the world's smallest and cheapest (manufacturer's claim) power hacksaw to an all-British bathroom, including WC, will be shown.

Around 15 metalworking companies, mostly in the cutlery and hand tool industries, will be represented.

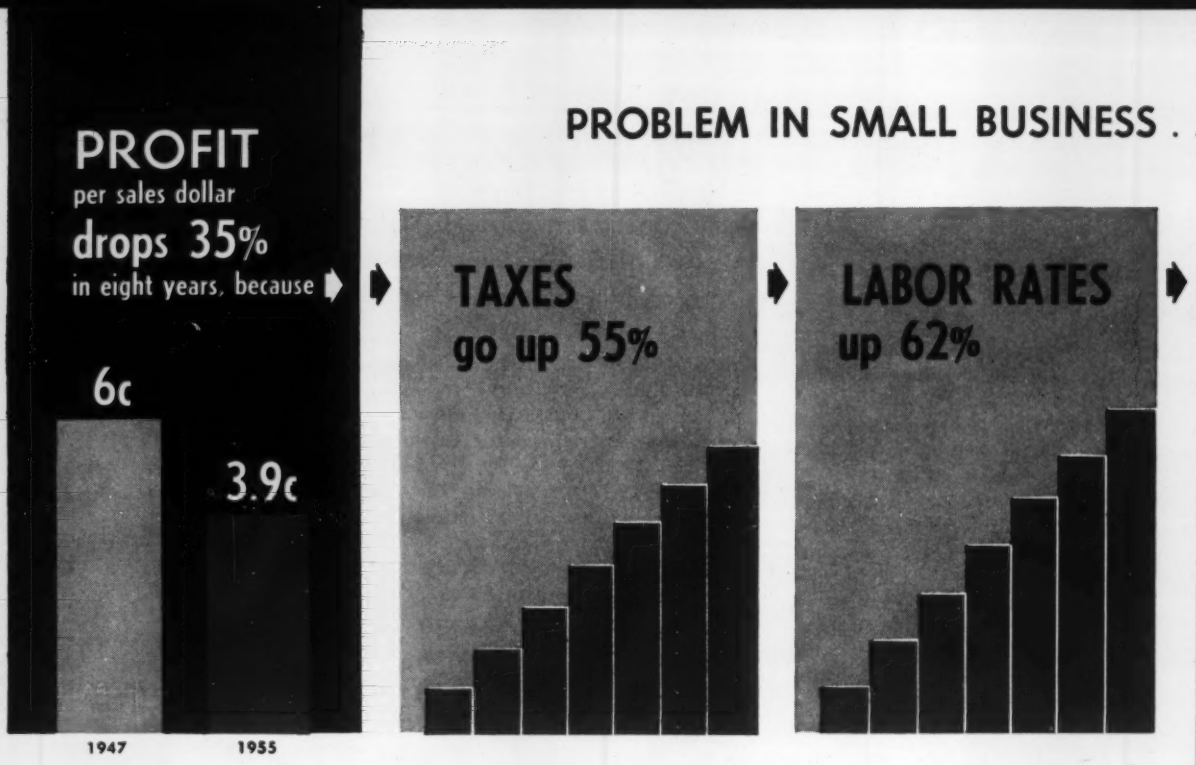
Metalworking in Puerto Rico

Twenty-nine U.S. companies have opened metal fabricating plants in Puerto Rico during the last ten years, reports the commonwealth's Economic Development Administration.

During 1955 the value of goods shipped to continental U.S. exceeded $5 million, and manufacturers earned an average net profit of 14 per cent. The average in this country is 4 per cent (after taxes).

Production includes tin cans, sprinkler irrigation parts, aluminum windows, doors and screens, copper wire, tools and dies. Services include vacuum plating, metal stamping, sand casting, zinc, chrome, copper and cadmium plating.

To attract new industry, Puerto Rico grants exemption from local taxes to firms engaged in the manufacture of a product not made on the island before 1947. Federal taxes do not apply because the commonwealth has no voting representation in Congress.



How To Be a Junior Giant

Profits slipping? They need not, even if you're small or in an industry like screw products where the trend is down. Here's how two tiny firms' profit ratios parallel General Motors'

THE PICTURE above is dismal; the one at the bottom of page 63 shows there's hope.

The statistics above were reported to the National Screw Machine Products Association by companies which are mostly small and mostly contract manufacturers. Their situation is similar to that of smaller job shops in many metalworking industries—including stampings, castings, fasteners, machine shops.

Dark Side—"Our profits per dollar of sales were 54 per cent lower in 1955 than in 1937," points out Orrin B. Werntz, NSMPA's executive vice president. "Federal taxes rose from 16.7 per cent of gross sales in 1937 to 48.7 in 1955." The charts compare 1947 and 1955.

The squeeze has many bad effects, but probably the most serious is that makers of screw machine products and many other smaller firms find it more and more difficult to re-equip. A company with average profits and sales of $1 million a year would have net earnings of only $39,000, plus a tax depreciation credit of about $11,000. Even if it used every penny of its profits and tax credit for re-equipment, it would still have only $50,000 for the purpose. One complete multiple spindle screw machine costs about $25,000.

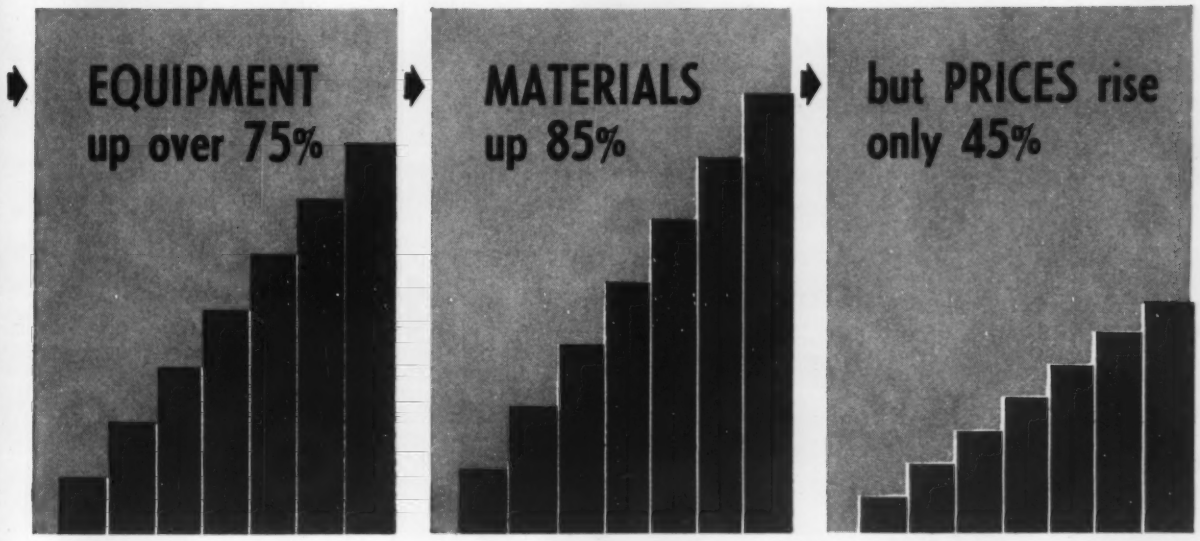
Bright Side—A few companies are showing the industry the way out. The performances of a junior GM 1/10,000 the size of the world's largest corporation and another 1/20,000 as large compare favorably with that of the auto maker. Junior A and Junior B are doing as well as or better than GM on three counts—profits as a percentage of sales, average annual wages paid to hourly workers and sales per employee. Both juniors had an average return of 18.5 per cent on net worth, precisely the same as GM.

But note another point. Both juniors have to use up their facilities far more rapidly than GM to keep up. That's indicated in the volume of sales times the value of fixed assets. The relatively low depreciation rate, expressed as a percentage of sales, also shows that the equipment was worked hard.

The low depreciation percentage likewise can mean that the companies aren't amortizing fast enough. Without an adequate modernization program, even they won't be able to decrease costs or increase productivity sufficiently to still be pacing GM a decade hence.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*

. as seen in the screw products industry



Solution: Two Small Firms Match GM's Statistics

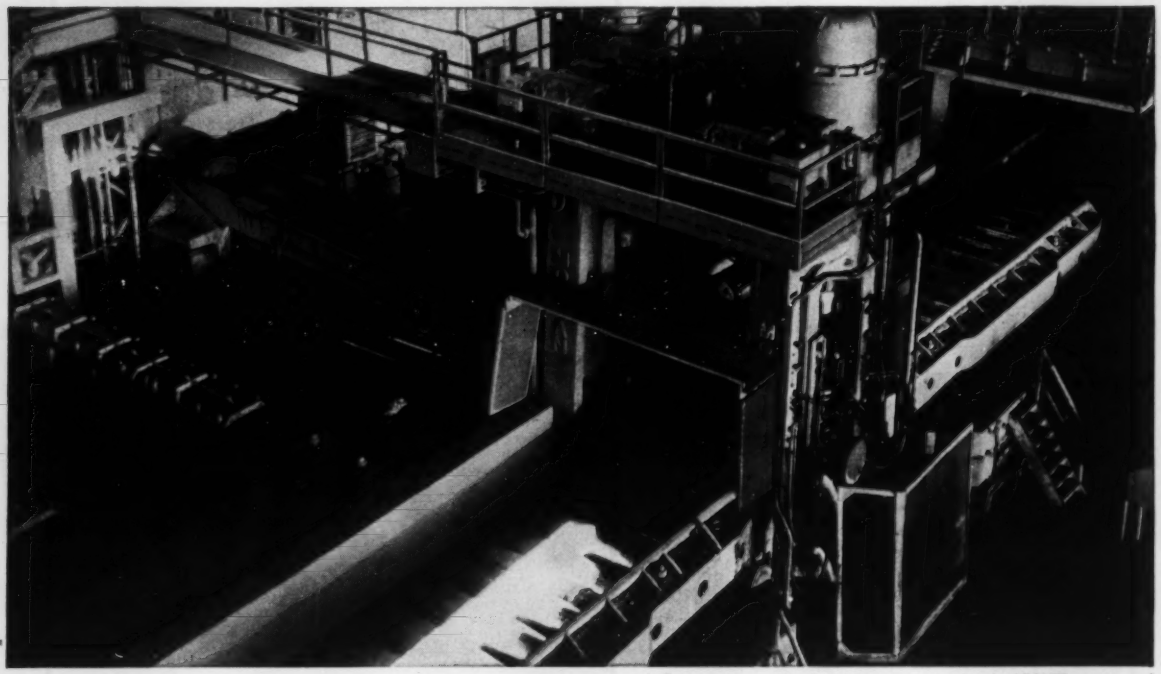
	1956 SALES	NET PROFIT	PROFIT AS % OF SALES	FACTORY EMPLOYMENT	AVG. ANNUAL SALARY	SALES PER EMPLOYEE	SALES TIMES FIXED ASSETS	DEPRECIATION AS % OF SALES
General Motors	$10,796 million	$847 million	7.8	599,000	$4800	$18,000	3.6	3.2
Small Co. "A"	$1.2 million	$91,800	7.8	59	$5800	$19,900	7.3	2.4
Small Co. "B"	$510,000	$48,600	9.5	28	$4900	$18,200	18.6	1.0

Eight Ways Junior Giants Do It

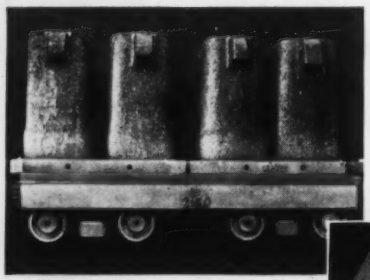
1. Sell on quality, not price (and still keep volume up).
2. Accent engineering service to customers.
3. Meet delivery schedules as promised.
4. Use statistical management to know production costs, sales expenses, profit ratios.
5. Turn down jobs that don't show reasonable profit.
6. Accent engineering in shop to cut costs.
7. Use modern equipment.
8. Make maximum use of equipment (two to five times as extensively as GM).

DETROIT STEEL, PORTSMOUTH DIVISION

Portsmouth, Ohio



44″ blooming mill roll tables are completely HYATT equipped



All four-wheel ingot buggies have two HYATT Roller Bearings per journal

Another progressive plant that

HANDS THE HEAVY LOADS TO HYATTS !

Roll tables of the 54″ hot strip mill are fully equipped with HYATTS

HYATT Roller Bearings are installed on all open hearth charging box cars

In addition to the key installations pictured above, all mill motors are equipped with HYATTS, too. Like so many other leading steel producers, Detroit Steel Corporation can't afford to depend on anything less than the *best* in roller bearings. *Can you?* Hyatt Bearings Division, General Motors Corporation, Harrison, N.J., Pittsburgh, Detroit, Chicago and Oakland, California.

GM GENERAL MOTORS

Watch "WIDE WIDE WORLD" Sundays on NBC-TV

HYATT ***HY-ROLL BEARINGS***

FOR STEEL INDUSTRY

Auto Company Forecasts

(1957 Vs. 1956)

	GM	Ford	Chrysler
Dollar sales	Down 10%	Up 15%	Up 20%
Unit sales	Down 15	Up 12	Up 22
Net earnings	Down 25	Up 18	Up 300
Share of industry	43%	33%	20%

Source: Adapted from report of McDonnell & Co., New York.

Spring Hits Detroit

Second quarter production cuts cause optimists to retreat from their prediction of a 6.5 million car year. Bright spot: Higher prices will boost the industry's income

PESSIMISTS are having a field day in Detroit. Reason: *Ward's Automotive Reports* says April-June production schedules have been cut 11.1 per cent below January-March figures.

The slash is twice as deep as expected. It means second quarter output will total 1.6 million vehicles, about 150,000 short of the figure for the same period last year.

Ward's says the move is evidence that the spring buying rush hasn't materialized. Although it's only the first week of April, this report is enough to sell gloom hounds who have been yelping almost since the first of the year.

Mills—Auto industry purchasing agents have said right along that they are trying to spread steel purchases evenly throughout the production year, but mills didn't believe them until a week or two ago.

Mill inventories of hot and cold rolled sheets are high, and furnaces have been shut down for repair. Great Lakes Steel Corp., Detroit, suggests: "We'll put our furnaces back in operation when we get some orders."

Optimists—So even before the tulips have popped, you hear the old refrain: "I told you so. We'll be lucky to turn out 6 million cars this year." But industry hopefuls are singing a different tune.

Robert S. McNamara, Ford's vice president and division general manager, predicts: "We expect (Ford division) sales for the first quarter to be up between 17 and 20 per cent from those of the first three months last year."

Mercury sales are 6 per cent ahead of 1956's. Lincoln sales are almost equal to 1956's.

Chrysler Corp. is holding its newly gained 20 per cent of the market. Company sales have increased an average of 18 per cent so far, with Plymouth and De Soto divisions showing the highest percentage increases.

Cellar Reports—Even in GM circles, some divisions are holding their own. Cadillac is 6 per cent ahead of last year's pace. Pontiac is down slightly. Olds and Buick are hardest hit. Some estimates place their declines between 15 and 20 per cent.

Balance—The convincing forecasts take the middle of road. McDonnell & Co., a New York investment house, offers an interesting report (see table, left).

It says: "Industry dollar sales will stay the same (as in 1956) or increase 4 per cent. Next year could be a big one, but 1960 is more likely.

"The change in unit sales will be limited to 3 or 4 per cent up or down, probably down."

Interpretation—In other words, while unit sales are likely to be no better than last year's, higher car prices will increase the industry's dollar income.

Low priced cars, says the study, probably will make sales increases, cutting into territory dominated by medium priced autos last year.

Adds the report: "The Ford promises to hold the industry leadership in unit sales."

All the talk points to a steadying year for autos. Production isn't apt to hit the predicted 6.5 million, but dollar income will be higher than 1956's.

If auto makers live up to what they've been saying, the industry will be making and selling cars right around the calendar. There are still nine months left in the 1957 sales year.

Survey on Stainless

"An overwhelming majority of car owners want auto manufacturers to retain or increase the amount of trim on new models," says the Committee of Stainless Steel Producers (AISI), New York.

But a strong dissent was noted by the independent organization which made the survey. It found that 35.7 per cent want less trim. The majority, 59.2 per cent, want

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the new models to have about as much trim as present cars. More trim is desired by 4.7 per cent.

More than 40 per cent of those surveyed say they are willing to pay a premium for superior quality trim.

What material is best for trim? Stainless steel, wrote 57 per cent of the 500 persons queried. Other metals (presumably zinc and aluminum) were wanted by 33.5 per cent, and 12.5 per cent had no opinion.

Richard E. Paret of the sponsoring committee comments on the results: "This survey has confirmed our belief that the average car owner prefers stainless steel for brightwork." Aluminum Co. of America, Reynolds Metals Co., and Kaiser Aluminum & Chemical Corp. are rumored to be taking surveys of their own.

SAE Hears of Cheaper Dies

Inexpensive zinc-base dies are being used by GM for sheet metal forming of refrigerator parts and truck panels. They are said to have a longer life than regular zinc-base dies and are cheaper than ferrous dies.

The material (GM calls it Gmoodie) was discussed at the March meeting of the Society of Automotive Engineers in Buffalo.

J. C. Holzwarth, supervisor of GM's metallurgical engineering department's research staff, and S. Menton, manager of the overseas operations manufacturing staff, presented the paper: "Wear Resistant, Low Cost Sheet Metal Forming Dies." Their conclusions:

- Gmoodie is capable of outwearing conventional zinc-base tools by a ratio of about 4 to 1 when used to form 18 to 20 gage cold rolled steel.
- This ratio decreases as the severity of draw or the thickness of the steel is increased.
- For light drawing and forming, Gmoodie will produce from 100,000 to 200,000 stampings; for moderate drawing, about 50,000; for severe draws, about 25,000 or less.
- The tools cost about one-fourth to two-thirds that of ferrous dies. Including metal recovery costs, they almost equal the price of conventional zinc-base dies.
- Gmoodie tools require considerably more maintenance than hard ferrous tooling.
- Sheet steel requires more careful preparation than that worked by hard dies.

AMC Hangs On

American Motors Corp. will continue to make all of its present car models and will seek more mergers and diversifications to strengthen it appliance business.

That's the outcome of the conference between George Romney, AMC president, and Louis Wolfson, majority stockholder.

Recent rumors had it that Mr. Wolfson would take control of AMC; that all car lines, at least Nash and Hudson production, would be stopped and that Chrysler Corp. might buy out the Rambler and Metropolitan lines.

But the meeting apparently went off smoothly with both men agreeing to continue present business and look for more. Mr. Wolfson declined a seat on the board and has expressed confidence in Mr. Romney's leadership.

Mr. Romney did mention that some companies had been discussed as possible acquisitions. Mr. Wolfson owns a majority of the stock or a controlling interest in a couple of the firms.

It appears that AMC tax credits, partially resulting from operating losses in the car divisions, make it worthwhile to keep these models in production so the company can gain cash for other expansions.

The time may come when tax credits from losses will be offset by total company profits. If it does, observers still feel that Nash and Hudson will go by the boards.

U.S. Auto Output

Passenger Only

	1957	1956
January	642,089	612,078
February	571,098	555,596
2 Mo. Total	1,213,187	1,167,674
March		575,260
April		547,617
May		471,617
June		430,373
July		448,876
August		402,575
September		190,726
October		389,061
November		581,803
December		597,226
Total		5,802,808

Week Ended	1957	1956
Feb. 23	138,938	125,537
Mar. 2	140,362	132,889
Mar. 9	140,161	132,840
Mar. 16	141,038	131,207
Mar. 23	140,719†	131,287
Mar. 30	140,500*	125,850

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Mercury Moves Out

We've been interested in customer reaction to Mercury's styling. There is little fence sitting. Prospects are enthusiastic or violently opposed to the offset fins and color treatments.

Sales are slightly ahead of last year's (see page 65).

We won't offer an opinion on style, but performancewise, Mercury has real guts under the hood. The 190 V-8 engine turns out 405 ft-lb of torque at 2800 rpm—enough to fishtail the car when starting on a dry pavement.

Our test model was a four-door hardtop in the Montclair series. It weighed about 4000 lb and the speedometer was uncorrected. Here are our results:

- Average acceleration (0-60 mph): 9.4 seconds, including transmission shifts.
- Average acceleration (0-30 mph): 4.7 seconds with shift.
- Passing range speed (45-65): 4.3 seconds.
- Average top speed: 108 mph (highest top speed was 114 mph).

Gas consumption in town averaged 12.6 mpg and was an even 14 mpg on the highway.

Braking is good considering car weight. Traveling at 60 mph, it takes eight stops before brakes fade out to the danger point.

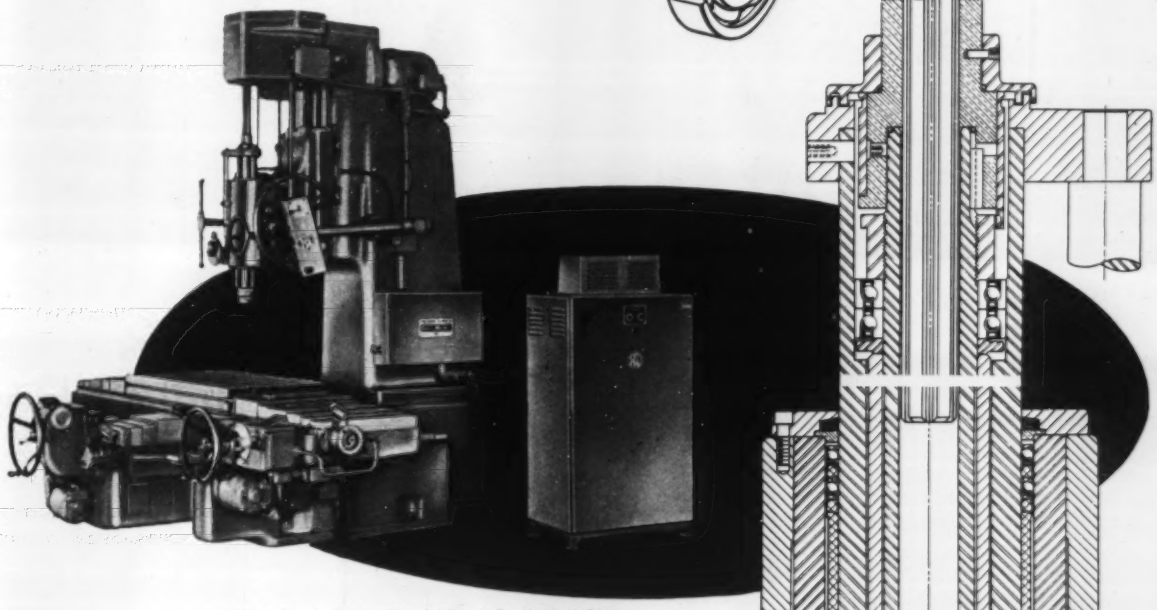
Mercury is a soft riding car which tends to make it a little sluggish on the corners, but the ride is extremely smooth, and there is almost no front end dip on routine stops for lights and intersections.

We personally feel the instrument panel could use a face lift. The ash tray is completely out of the driver's reach and Mercury's memory seat (an ingenious gadget which automatically returns the seat from a full rear to a preset position) frankly is a bother. For us, at least, these items are safety hazards.

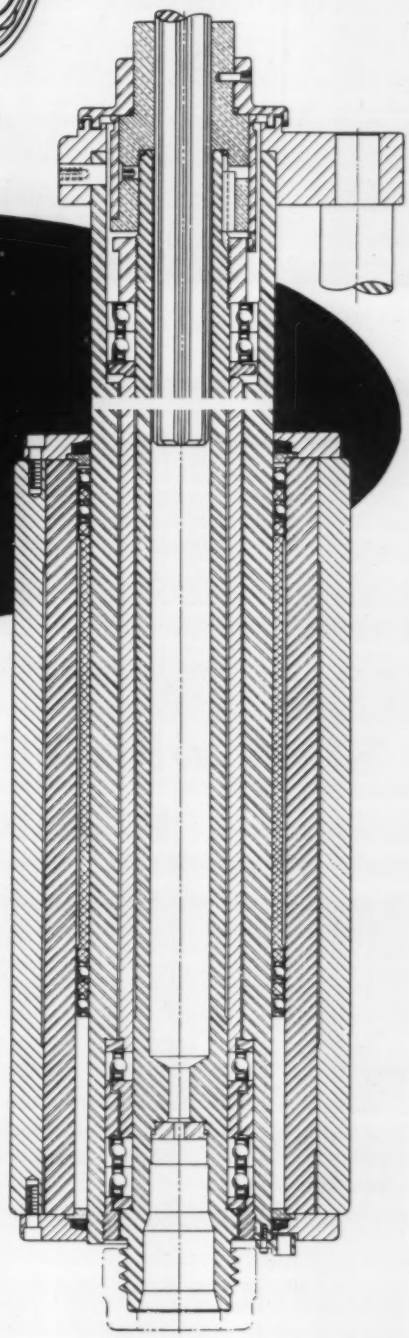
FACTS

about

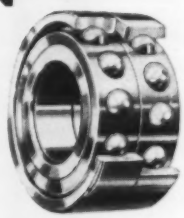
NEW DEPARTURE BALL BEARINGS



5 3E Jig Borer—Courtesy Pratt & Whitney Co., Hartford, Conn.



INVESTMENT IN PRECISION



New Departure Duplex ball bearings are available in a complete range of sizes and series and are made to the finest precision tolerances.

No finely built machine entrusted with cutting metal to extremely small tolerances can be any more precise than the bearings on which its major rotating parts depend.

That's why you'll find this exquisitely accurate Jig Borer Spindle is mounted on New Departure preloaded duplex *ball* bearings. These bearings assure *permanent precision* through a wide range of speeds and feeds.

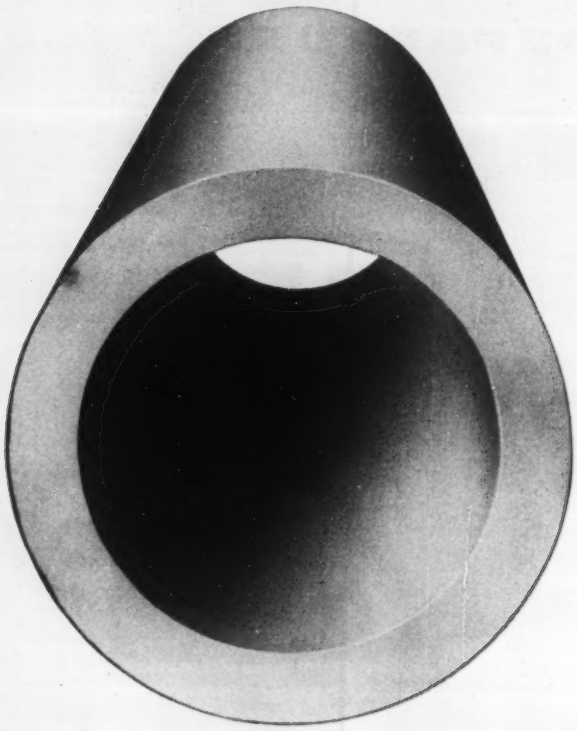
As a further accuracy feature, the hardened, ground and lapped spindle quill moves on a large number of preloaded steel balls, thereby eliminating any clearances, however small, that would otherwise be required. For more details on New Departure preloaded duplex ball bearings, send for Catalog S.

SEE "WIDE WIDE WORLD" SUNDAYS—NBC-TV

BALL BEARINGS MAKE GOOD PRODUCTS BETTER

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONN.

How to step up production of hollow parts



Start with TIMKEN® seamless steel tubing—*no hole to drill!*

MAKING hollow parts from bar stock slows down production. You have to bore out the center hole. That takes extra time, increases production costs. But with Timken® seamless steel tubing, *the hole's already there.* Finish boring is your first production operation. You save a big step—increase production, reduce costs. With less metal to machine away you get more parts per ton of steel.

Because Timken seamless steel tubing eliminates one boring operation, it frees screw machine stations for other jobs. You add machining capacity without adding machines.

Timken seamless tubing also gives you a better quality finished product. The piercing process by which Timken seamless tubing is made is basically a forging operation. It gives you fine forged quality—a uniform spiral grain flow for greater strength and a refined grain structure. And we maintain this uniform quality through rigid quality control—tube to tube, heat to heat, order to order.

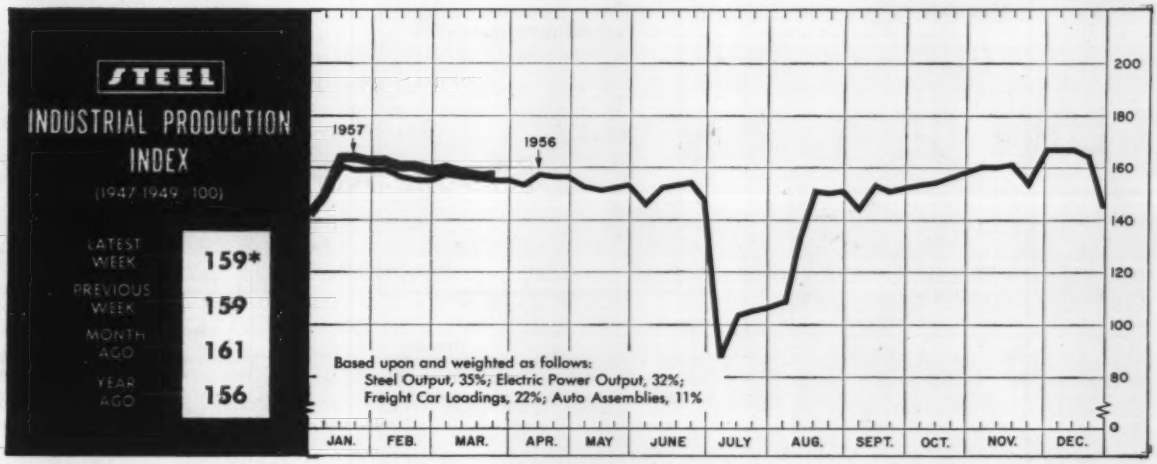
And to further increase your steel savings, Timken Company engineers will recommend the most economical tube size for your hollow parts job—a size guaranteed to clean up to your dimensions.

The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN *Fine Alloy* STEEL

TRADE-MARK REG. U. S. PAT. OFF.

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING



*Week ended Mar. 23.

Economic Plusses and Minuses Balance Out

"ROLLING adjustment" describes our economy on a regional basis nearly as well as on a production basis: Some sections of the country are booming while others aren't doing as well. But the overriding view is one of good business.

Great Lakes—The weekly business index of the Bureau of Business Research at the University of Pittsburgh for the latest week is 112.6 per cent of the 1947-1949 base. That's about equal to the tempo of recent weeks and still above the year-ago mark. In Cleveland, some cutbacks in steel output and auto factory employment in the past month have caused a slight decline in business activity. The over-all level is still near the all-time high of late 1956. In Detroit, auto operations are holding above 1956 levels but are not as high as anticipated. In Chicago, steelmaking is down a bit, and agricultural machinery has not picked up appreciably.

East—At a meeting of top-level businessmen in New England last week, the prevailing attitude was "cautious optimism." Said one observer: "Those men were anything but pessimistic." Brass mills are definitely below par, but most other manufacturing companies are working full time.

Midwest — Farmers' income is still expected to rise this year, which should revive their interest in new equipment and buildings. Banking statistics from the Federal Reserve Bank of Kansas City, Mo., indicate that business is holding above the year-ago pace.

Southeast—Industrial expansion is slowing a bit because of tight money but not enough to change the character of the trend. But the textile industry is still in the doldrums and is without too much hope for immediate revival. Oil is still a big factor in the area (Federal Reserve District 6, including part of Louisiana), but it fluctuates with international tensions.

Southwest — "The plusses and minuses are about equal, but the zip is still there as the result of manufacturing expansion," reports

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,354[1]	2,392	2,452
Electric Power Distributed (million kw-hr)	11,700[1]	11,650	11,134
Bituminous Coal Output (1000 tons)	10,190[1]	9,700	9,264
Petroleum Production (daily avg—1000 bbl)	7,700[1]	7,799	7,163
Construction Volume (*ENR*—millions)	$375.9	$412.3	$501.3
Auto, Truck Output, U. S., Canada (*Ward's*)	173,875[1]	172,477	167,519
TRADE			
Freight Car Loadings (1000 cars)	680[1]	689	697
Business Failures (Dun & Bradstreet)	301	327	300
Currency in Circulation (millions)[3]	$30,589	$30,609	$30,264
Dept. Store Sales (changes from year ago)[3]	+2%	−10%	−3%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$26,123	$21,783	$23,977
Federal Gross Debt (billions)	$274.8	$276.1	$277.7
Bond Volume, NYSE (millions)	$17.4	$18.1	$22.4
Stocks Sales, NYSE (thousands of shares)	8,061	8,288	14,088
Loans and Investments (billions)[4]	$85.7	$85.0	$85.3
U. S. Govt. Obligations Held (billions)[4]	$25.7	$25.5	$28.4
PRICES			
STEEL's Finished Steel Price Index[5]	227.41	227.41	209.10
STEEL's Nonferrous Metal Price Index[6]	240.1	239.9	285.3
All Commodities[7]	116.9	116.9	112.8
Commodities Other Than Farm & Foods[7]	125.3	125.4	120.7

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1957, 2,559,490; 1956, 2,461,893. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

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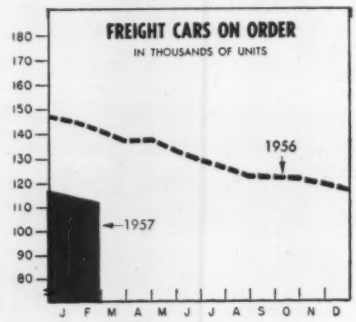
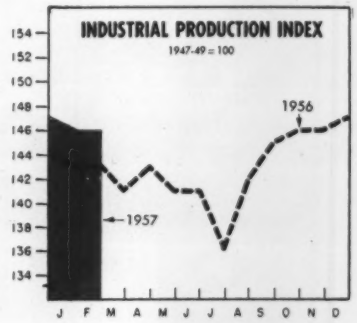
THE BUSINESS TREND



	Awards 1957	Awards 1956	Backlog (end of month) 1957	Backlog (end of month) 1956
Jan.	5,328	1,818	114,656	144,946
Feb.	6,065	1,675	111,965	141,437
Mar.	....	1,618	.....	137,070
Apr.	....	6,559	.....	137,436
May	....	2,403	.....	133,072
June	....	2,859	.....	129,409
July	....	2,642	.....	126,194
Aug.	....	2,575	.....	122,870
Sept.	....	3,949	.....	122,421
Oct.	....	6,532	.....	122,250
Nov.	....	4,172	.....	119,626
Dec.	....	4,992	.....	117,320
Totals	....	41,794		

American Railway Car Institute.
Charts copyright, 1957, STEEL.



(Seasonally adjusted)

	Total Production 1957	Total Production 1956	Primary Metals 1957	Primary Metals 1956	Metal Fabricating 1957	Metal Fabricating 1956
Jan.	146	143	144	148	180	170
Feb.	146*	143	143*	146	180*	168
Mar.	...	141	...	145	...	166
Apr.	...	143	...	146	...	171
May	...	141	...	141	...	167
June	...	141	...	138	...	165
July	...	136	...	68	...	169
Aug.	...	142	...	124	...	172
Sept.	...	145	...	148	...	174
Oct.	...	146	...	147	...	177
Nov.	...	146	...	147	...	180
Dec.	...	147	...	145	...	183
Avg.	...	143	...	137	...	172

Federal Reserve Board. *Preliminary.

Herbert A. Leggett, vice president of the Valley National Bank of Phoenix, Ariz. Manufacturing is now the biggest source of employment and income in the area. Agriculture is still sluggish, and the drop in the copper market may cause some cutbacks at the mines in the future. The bank's index of business is at a peak but will decline seasonally this month.

West—This is one of the "boomiest" areas in the nation. Of nine indicators published by the Bureau of Economic & Business Research at the University of Utah, five are ahead of year-ago performances while three are lagging. In California—especially the southern part—plant expansion is maintaining the torrid pace set in 1956. The business index of the Security-First National Bank of Los Angeles in January was only a fraction of 1 per cent under the record set in December.

Freight Car Orders Up

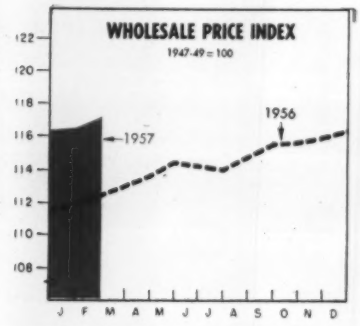
Railroads are maintaining an active interest in new equipment, having placed orders for 6065 new cars in February (see chart above). This is the highest number since last October and is well above the 1956 monthly average of 3979 cars. Car builders shipped 7655 cars in February, compared with 7822 in January. This cut the backlog to 114,656 cars.

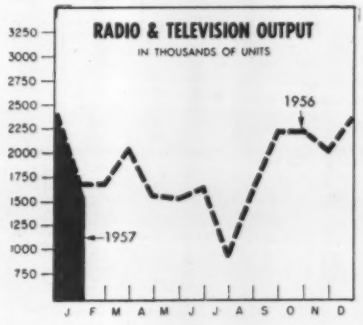
During January and February, the roads installed 244 locomotives in service, the same as in the corresponding 1956 period. On Mar. 1, the backlog was 867 locomotive units, compared with 897 on Mar. 1, 1956, says the Association of American Railroads.

Failures Set Record

The high number of business failures continues to be one of the sore spots among business statistics. In February, the total of 1146 was just two short of the January figure, setting a postwar record for the month. Current liabilities of $65,406,000 established a record for any postwar month, states Dun & Bradstreet Inc. The rate of failures (number per 10,000 firms listed) also is climbing. February's rate of 51 was above the January, 1957, and February, 1956, figures.

When final figures are in for March, the picture is expected to be even worse. During the first two weeks of the month, failures added up to 628, compared with





	All Commodities 1957	All Commodities 1956	Other Than Farm & Foods 1957	Other Than Farm & Foods 1956
Jan.	116.9	111.9	125.2	120.4
Feb.	117.0	112.4	125.5	120.6
Mar.	....	112.8	....	121.0
Apr.	....	113.6	....	121.6
May	....	114.4	....	121.7
June	....	114.2	....	121.5
July	....	114.0	....	121.4
Aug.	....	114.7	....	122.5
Sept.	....	115.5	....	123.1
Oct.	....	115.6	....	123.6
Nov.	....	115.9	....	124.2
Dec.	....	116.2	....	124.6

U.S. Bureau of Labor Statistics

	Radio 1957	Radio 1956	Television 1957	Television 1956
Jan.	1,086	1,079	450	588
Feb.	....	1,094	...	576
Mar.	....	1,360	...	680
Apr.	....	993	...	550
May	....	1,060	...	468
June	....	1,073	...	553
July	....	567	...	337
Aug.	....	991	...	613
Sept.	....	1,319	...	894
Oct.	....	1,349	...	821
Nov.	....	1,382	...	680
Dec.	....	1,715	...	627
Totals	....	13,982	...	7,387

Radio-Electronics-Television Mfrs. Assn.

only 604 for the like period of February.

At the same time, business incorporations slowed down seasonally, dipping to 12,075 from January's all-time high of 14,632. Compared with year-ago statistics, February declined 3 per cent.

Index Holds Steady

Just as cold weather raises the output of electric power, a warm spell reduces it. In the week ended Mar. 16, the first touch of spring dropped output to 11.65 billion kwhr, reports Edison Electric Institute. The downtrend continued into the following week.

STEEL's industrial production index managed to hold at 159 (1947-1949=100) despite this weakness. Steel operations have been at about 2.4 million net tons a week for ingots and castings for the last three weeks. Output may slip even more before a rush to beat price increases pushes it up moderately by the end of the second quarter.

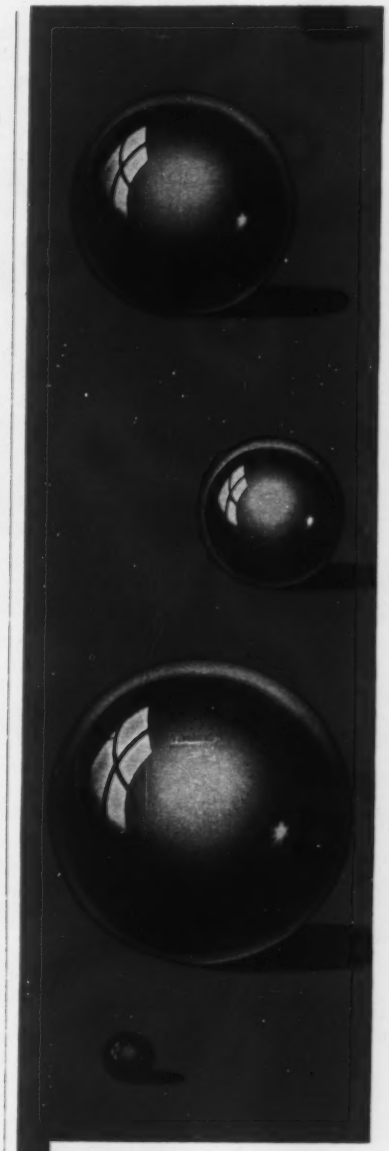
Auto and truck assemblies are firm at close to 162,000 units a week. A rise in truckmaking following settlement of a strike at an axle supplier's plant may be offset by a cutback in autos.

Freight car loadings during the week ended Mar. 16 rose above the year-ago level for the first time in 1957, reports the Association of American Railroads (689,-226 vs. 685,985). If this develops into a trend, it will be an important factor in negating some of the anticipated weakness in steel operations and electric power output. There is nothing to indicate that STEEL's index will vary greatly from its sidewise movement in the near future.

Trends Fore and Aft

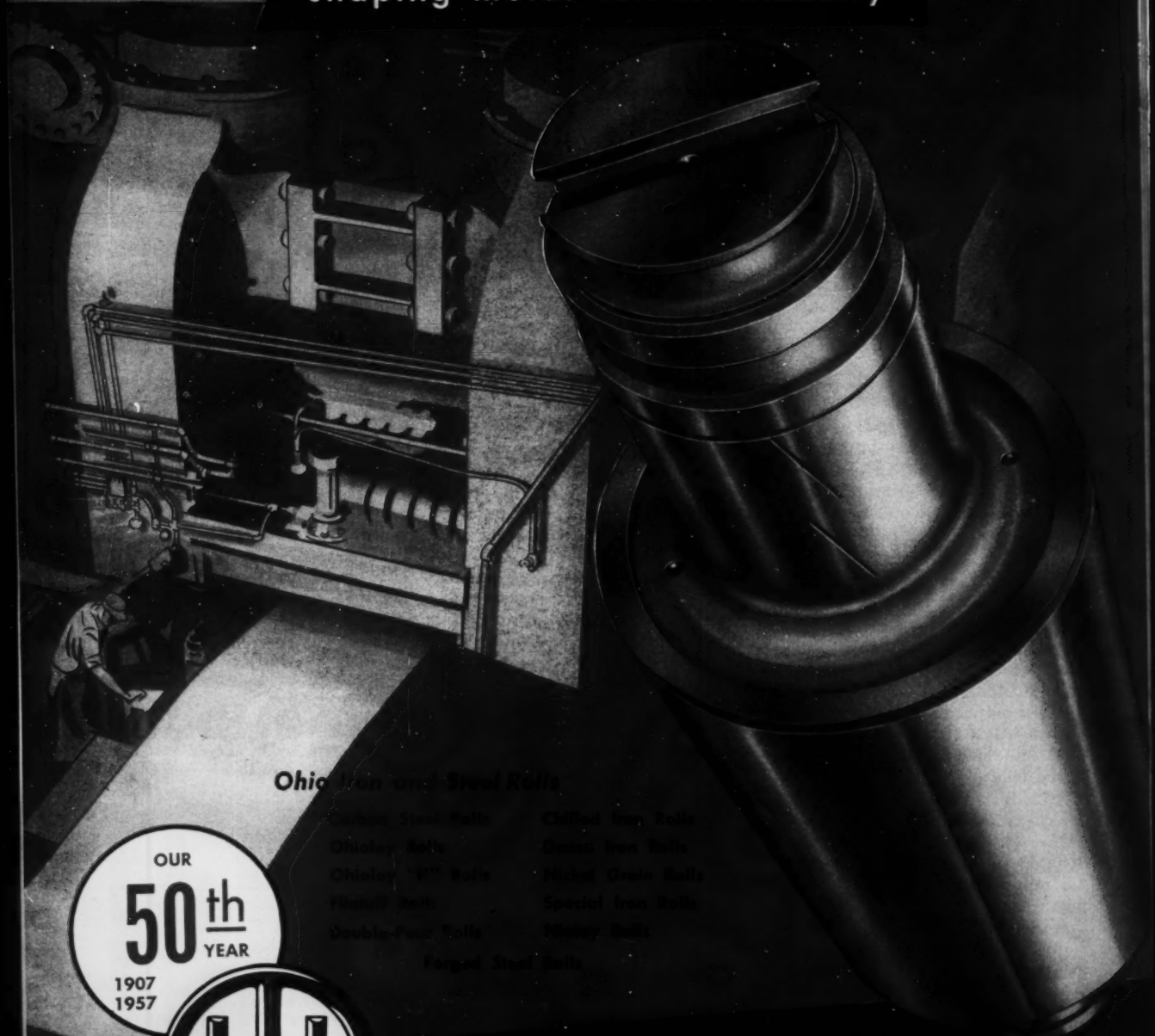
• New orders for machine tools dipped to $58,150,000 in February, reports the National Machine Tool Builders' Association. Shipments increased to $78.1 million, and the backlog dropped to 5.8 months. Cincinnati Milling Machine Co. entered 1957 with a backlog of $102 million, compared with $93.4 million the year before.

• "Distress selling by some manufacturers will continue for a while, but both the television and appliance business should improve considerably in the last six months of this year," says Ross D. Siragusa, president of Admiral Corp., Chicago.



Ohio Rolls

shaping metal for all industry



Ohio Iron and Steel Rolls

Various Steel Rolls — Chilled Iron Rolls
Ohiolay Rolls — Semi-Steel Rolls
Ohiolay "H" Rolls — Nickel Grain Rolls
Flintoff Rolls — Special Iron Rolls
Double-Pour Rolls — Shipley Rolls
Forged Steel Rolls

OUR 50th YEAR
1907
1957

THE OHIO STEEL FOUNDRY CO.
LIMA, OHIO

Plants at Lima and Springfield, Ohio

PERCY L. DOUGLAS
Baker-Raulang president

DONALD C. CAMPBELL
Skinner Chuck works mgr.

VERNON E. RIDDELL
plant supt. at Cross

WILLIAM E. CROUCH JR.
TC&I v. p.-operations

Percy L. Douglas was elected president, **Baker-Raulang Co.**, Cleveland, subsidiary of Otis Elevator Co. He continues as executive vice president of Otis. **William A. Bauer** resigns as Baker-Raulang president to re-enter the investment banking business in New York.

William A. McCarthy was made sales manager, **Victoreen Instrument Co.**, Cleveland. He directs sales for the instrument and component divisions. **Joseph M. Johnston** was made operations superintendent for both divisions. Mr. McCarthy was with Tracerlab Inc., most recently as Cleveland sales representative. Mr. Johnston was with El-Tronics Inc. as both chief engineer and operations manager.

Joseph V. Quarles was elected senior vice president and general manager, **Simmons Co.**, New York. He succeeds **G. D. Wrightson**, retired. Until last January, Mr. Quarles was central division manager at the Kenosha, Wis., plant.

Joseph J. Hauser, former sales engineer, **Sahlin Engineering Co. Inc.**, Birmingham, Mich., was made assistant sales manager.

Thomas F. Fitzgibbon was made manager, hydraulic division, **Parker Aircraft Co.**, Los Angeles. He was chief engineer of the division which he helped to establish in 1953.

Robert H. Howard was named assistant to the director, general planning, **Kaiser Steel Corp.**, Oakland, Calif.

Donald C. Campbell was made works manager, **Skinner Chuck Co.**, New Britain, Conn. He served in a similar position at Whirlpool-Seeger Corp. for the last five years. Prior to that he was production manager for Joy Mfg. Co.

Vernon E. Riddell was appointed general superintendent of **Cross Co.'s** new plant in Fraser, Mich. He was plant manager of Vinco Corp. in Detroit.

Franklin H. Kissner, formerly comptroller, Lever Bros. Co., was elected executive vice president of **Dyson Corp.**, New York.

D. W. Kaufmann was made manager of marketing for **Rem-Cru Titanium Inc.**, Midland, Pa. He was eastern sales manager.

John L. Taylor, vice president-sales, **Edwards Co. Inc.**, Norwalk Conn., was elected executive vice president.

C. William Miller joined the executive staff of **Volkert Stampings Inc.**, Queens Village, N. Y., to serve on special assignment. He was with Philco Corp. in various purchasing capacities for 15 years.

Robert L. Larson was made general manager of the new Indianapolis plant now under construction for **Joseph T. Ryerson & Son Inc.** He was manager of the alloy steel division at Chicago. Other appointments at Indianapolis: **Fraser Martin**, superintendent; **Thomas P. Powers**, inside sales manager.

William E. Crouch Jr. was appointed vice president-operations at U.S. Steel Corp.'s **Tennessee Coal & Iron Division**, Birmingham. He succeeds **James W. Kinnear Jr.**, recently made executive vice president of the division. Mr. Crouch was general superintendent, Edgar Thomson Works.

Donald M. Werner was made sales manager, special products division, **United Steel Fabricators Inc.**, Wooster, O. He replaces **C. R. Clauer**, who resigned to enter private engineering practice. Mr. Werner was plant manager.

At **Caterpillar Tractor Co.'s** engine division, Peoria, Ill., **Randall Roman** was made chief engineer; **L. F. Redenius**, manufacturing manager; **R. D. Norris**, purchasing agent; **J. H. Gill**, sales manager; **W. N. Foster**, market services manager.

Elmer A. Trask was named Cleveland district manager, wire rope and aircord division, **John A. Roebling's Sons Corp.** He succeeds **Earl A. Frazier**, now New York district sales manager for the division.

Melvin A. Hanson succeeds **Lawrence L. Neebe**, retired, as chief engineer, **Magnus Metal Division**, National Lead Co., at Chicago.

William Lehr was appointed manager of the new Atlanta district sales office of **Babcock & Wilcox Co.'s** tubular products division.

Steve Ragsdale was made manager of development of **Clark Equip-**

RUDY B. VOGT

VICTOR W. SICKING

E. W. Buschman sales directors

CHARLES C. MORGAN

DONALD E. RICE

Columbia-Geneva operation posts

ment Co.'s material handling development center, Battle Creek, Mich.

E. W. Buschman Co., Cincinnati, elected **Rudy B. Vogt** and **Victor W. Sicking** (vice presidents) to direct sales for its three manufacturing divisions—pre-engineered gravity wheel and roller conveyors; overhead cable conveyors; engineered conveyor systems. Appointed district sales managers: **N. H. Inderhees** for district 1 (Indiana, Kentucky, Ohio); **J. R. Keen** for district 2 (20 western states); **H. L. Sellars** for district 3 (11 eastern states) **Conrad Myers** for district 4 (14 southern states).

John A. Dugan, former manager of production control at **West Steel Casting Co.**, Cleveland, was named to the new post of manager, shell molding division, and manager of customer service. **Bruce Aiken** was made manager-production control.

Datascan Inc. opened a manufacturing plant in Little Falls, N. J., and named **Morton S. Levin** director of engineering. He formerly was head of the electrical equipment research and design department at Tung-Sol Electrical Co.

Wilmer P. Hauck was made manager - manufacturing of **General Electric Co.'s** low voltage switchgear department at Philadelphia. He succeeds **C. Benjamin Ramsdell**, now general manager, commercial and industrial air conditioning department, Bloomfield, N. J.

R. W. Ruddle was made technical manager of **Foundry Services Inc.**, Columbus, O. He has been associated with Foundry Services Ltd., Birmingham, England.

Richard P. Simmons was made manager of processing at the Toronto, O., plant of **Titanium Metals Corp. of America**, jointly owned by Allegheny Ludlum Steel Corp. and National Lead Co.

Milo L. Phillips was made sales manager of **Alloys & Chemicals Mfg. Co. Inc.**, Cleveland.

Courtney M. Johnston was elected president of the newly incorporated **C. M. Johnston Co. Inc.**, Buffalo, distributor of stainless steel. **Roger P. Daniels** was named sales manager.

Rudolph A. Fisher was named buyer for the Fostoria, O., foundry division of **Electric Auto-Lite Co.**

General Electric Co. named **Wyman Goss** manager of the phenolics product plant, chemical materials department, at Pittsfield, Mass. He succeeds **J. L. Galt**, now west coast marketing manager with the department's Anaheim, Calif., operations.

O. S. Haskell, former sales manager, furnace and oven division, General Electric Co., joined the sales organization of **Lindberg Engineering Co.** and Lindberg Industrial Corp., Chicago. He will serve as field representative, east coast offices, with headquarters in Greenwich, Conn.

Westates Steel Co., Santa Clara, Calif., appointed **Jack W. Doane** sales manager; **Woodrow W. Gephart**, plant superintendent and purchasing agent.

Charles C. Morgan was appointed general superintendent, Pittsburg, Calif., Works, **Columbia - Geneva Steel Division**, U. S. Steel Corp. Formerly general superintendent of the division's Torrance, Calif., operations, he succeeds **Donald E. Rice** who was made general manager-operations of the division with headquarters in San Francisco.

A. E. Sneden was named product manager, wire and cable division, **National Electric Products Corp.**, Pittsburgh. He was vice president-director of sales for Lowell Insulated Wire Co.

Robert Mercer was made district manager, west coast region, **Lamson Mobilift Corp.** He will also manage the sales office in Berkeley, Calif.

Herbert C. Waldeck was made manager, New York office, **Consolidated Electrodynamics Corp.**

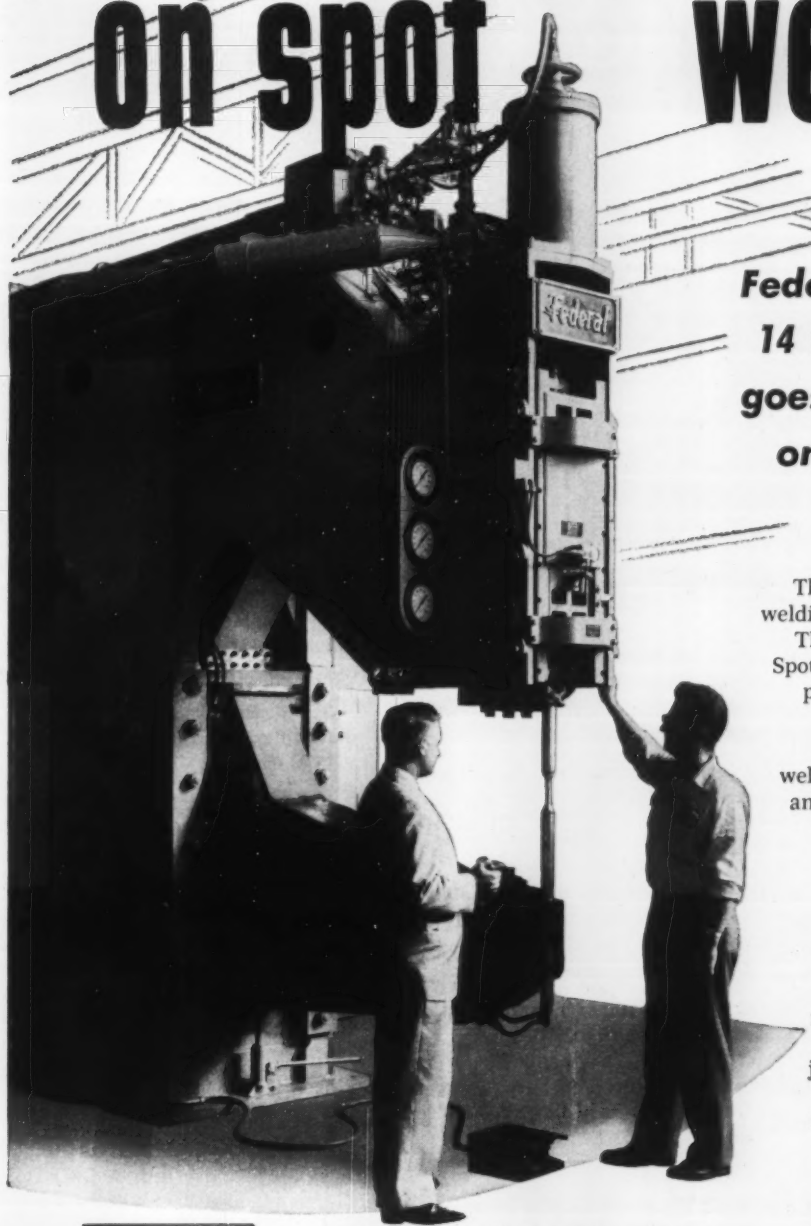
Orrin C. Bowers was named chief engineer, **BJ Electronics**, Los Angeles.

Raymond E. Burton, former assistant sales manager, was made assistant director of marketing at **Koehring Co.**, Milwaukee.

W. A. Boone, sales manager, was elected vice president-sales, **Bell & Gossett Co.**, Morton Grove, Ill. He is succeeded by **A. B. Meeg**, formerly assistant sales manager.

Leonard A. Britzke was elected president of two American Can Co. subsidiaries: **Bradley Container Corp.**, New York; and **Pittsburgh Plastics Corp.**, West Pittsburgh,

...the BIGGEST story on spot welding!



Welding engineers testing record setting spot welder. Federal has been commissioned to build several more of these giants for aircraft manufacture.

Federal Built 14 ft., 28 ton giant goes into operation on west coast . . .

The biggest thing in aircraft spot welding—that's the huge new Federal Three Phase Frequency Converter Spot Welder designed to make spec plus welds on the tail section of a new commercial jet airliner.

More than 13 feet tall, the big welder weighs over 58,000 pounds, and has a special throat, or work clearance area, of some 2500 square inches.

The design and manufacture of the 12 ton unipolar transformer having an output in excess of 100,000 amperes and the requirements of meeting rigid deflection specifications on this large throat machine were just a few of the new problems encountered on this project. Federal experience and facilities once more provided the correct solutions.

Here again, is proof that large or small—standard or special—*Federal Stays First in Resistance Welding.*

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Warco® PRESSES

The Federal Machine and Welder Co.

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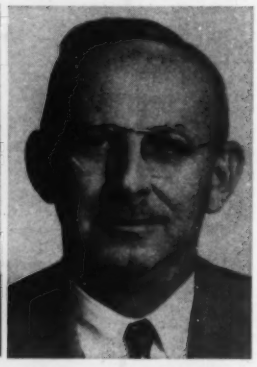
Warner Electric sales

ARTHUR A. KAPPENHAGEN
Republic Steel supt.

WILLIAM B. DOWNES
Crucible stainless sales

EDMOND J. WALSH
AS&W product sales

A. J. WILLIAMSON
Tube Reducing president



PETER J. SCHOENSTER
A. Hofmann exec. v. p.

Pa. He will have headquarters in New York.

American Steel & Wire Division, U.S. Steel Corp., Cleveland, named **Edmond J. Walsh** manager; **Raymond F. Nelson,** assistant manager in the manufacturers products sales section.

At **Brown & Sharpe Mfg. Co.'s** New York office, **John H. Biggs** was made district sales manager, machine tool division; **Robert E. Berger,** district sales manager, industrial products division.

L. L. Bechler joined **Electric Motor Development Co.,** Wickliffe, O., as marketing manager. He was manager of commercial motor sales at Jack & Heintz Inc.

Peerless Electric Co., Warren, O., appointed **Arnold Sherman** product engineer of its electronics division.

William J. Keller was named general manager, **Louis Marx & Co. Inc.,** New York. He succeeds **L. C. Feist,** retired.

A. J. Williamson was elected president, **Tube Reducing Corp.,** Wallington, N. J. He was executive vice president.

Peter J. Schoenster was elected executive vice president in charge of manufacturing at **Alfred Hofmann & Co.,** West New York, N. J.

Donald E. Lake was promoted to sales manager, Ohio division, **Associated Spring Corp.,** at Dayton, O. He was a salesman.

G. C. Van Heusden was made district manager of the new New York warehouse and office (Maspeth, L. I.) of **Chase Brass & Copper Co.,** subsidiary of Kennecott Copper Corp. He succeeds **Herbert H. Bartlett,** retired.

Paul Cain was made director of industrial engineering for **Armco Steel Corp.** and subsidiaries, Middletown, O. He was chief industrial engineer. **Malcolm Reed, George G. Davis, Mark S. Scheibert** and **Carl Funk** were made supervising industrial engineers.

Roger H. Brown was named sales manager, industrial division, **Warner Electric Brake & Clutch Co.,** Beloit, Wis. He was eastern regional sales manager.

At **Republic Steel Corp.'s** Youngstown district, **Arthur A. Kappenhagen** was appointed division superintendent of the steel plant. He is succeeded by **Joseph Turner** as superintendent of open hearth furnaces. **M. L. Stambaugh** replaces Mr. Turner as assistant superintendent-open hearth furnaces.

William B. Downes was appointed manager-stainless steel sales division, **Crucible Steel Co. of America,** Pittsburgh. He was assistant division manager.

Arthur Sternberg was made general manager, **Solar Permanent Co.,** division of U.S. Industries Inc., New York. He was director of purchasing for Clearing Machine Corp., also a division of USI.

Clifford Tuttle joined **Vitramon Inc.,** Bridgeport, Conn., as sales manager.

OBITUARIES...

Henry A. Merz, 79, vice president, **Milwaukee Bridge Co.,** Milwaukee, died Mar. 18.

Purdy F. Benedict, chairman, **Benedict-Miller Inc.,** Lyndhurst, N. J., died Mar. 17.

C. D. King, assistant to executive vice president - operations, **United States Steel Corp.,** Pittsburgh, died Mar. 24.

Arthur J. Wieland, 61, vice president, **Ford Motor Co.,** Dearborn, Mich., and general manager of its international division, died Mar. 21.

John R. Fulton, 44, vice president, **Wheelock, Lovejoy & Co. Inc.,** Cambridge, Mass., died Mar. 19.

Louis K. Gordon, 61, factory manager, **Cleveland Worm & Gear Co.,** Cleveland, died Mar. 23.

Joseph P. McNeill, executive vice president, **Empire Structural Steel Co.,** Syracuse, N. Y., died Mar. 11.

Arthur H. Vaughan, 45, president, **Steel & Alloy Sales Corp.,** Titustville, Pa., died Mar. 12.

ÆSOP'S FABLES No. 6

Pacing majestically along the seashore one day Mr. Lion spotted Mr. Dolphin basking on the water's surface. "Friend dolphin!" roared the lion . . . "I've been thinking that since I am king of beasts and you are king of fishes, why shouldn't we be strong friends and powerful allies?"

"You are absolutely right," replied the dolphin.

The very next day at the beach Mr. Lion was challenged by a wild bull. The lion was having a tough battle so he called upon the dolphin for help . . . though ready and willing, Mr. Dolphin found that he could not leave the sea. Finally, the bull was defeated and Mr. Lion turned angrily to the dolphin: "A fine ally you are . . . you were no help at all!"

"Don't blame me," retorted the dolphin, "because it was *nature* that made me strong in the ocean but altogether helpless on land."

MORAL:
The STRENGTH of your allies is as important as their will to help you.

. . . just so with some cements . . . they may be well-intentioned within rather limited conditions and uses . . . but famous ADAMANT, the *original* high temperature cement, is designed to withstand extreme temperature differentials . . . in fact, the bonding strength of ADAMANT *increases* as temperature rises . . . 'tis as strong as the brick it bonds! Too, pliable, ready-to-use ADAMANT has proved popular for a variety of other uses in maintenance and repair . . . let us tell you about it in our new Bonding Mortars Bulletin #3.

Yellow Pages of 'phone directory have your nearest ADAMANT Distributor.

Botfield
FOUNDED 1907
REFRACTORIES
ADAMANT and other ADA products
swanson and clymer sts.
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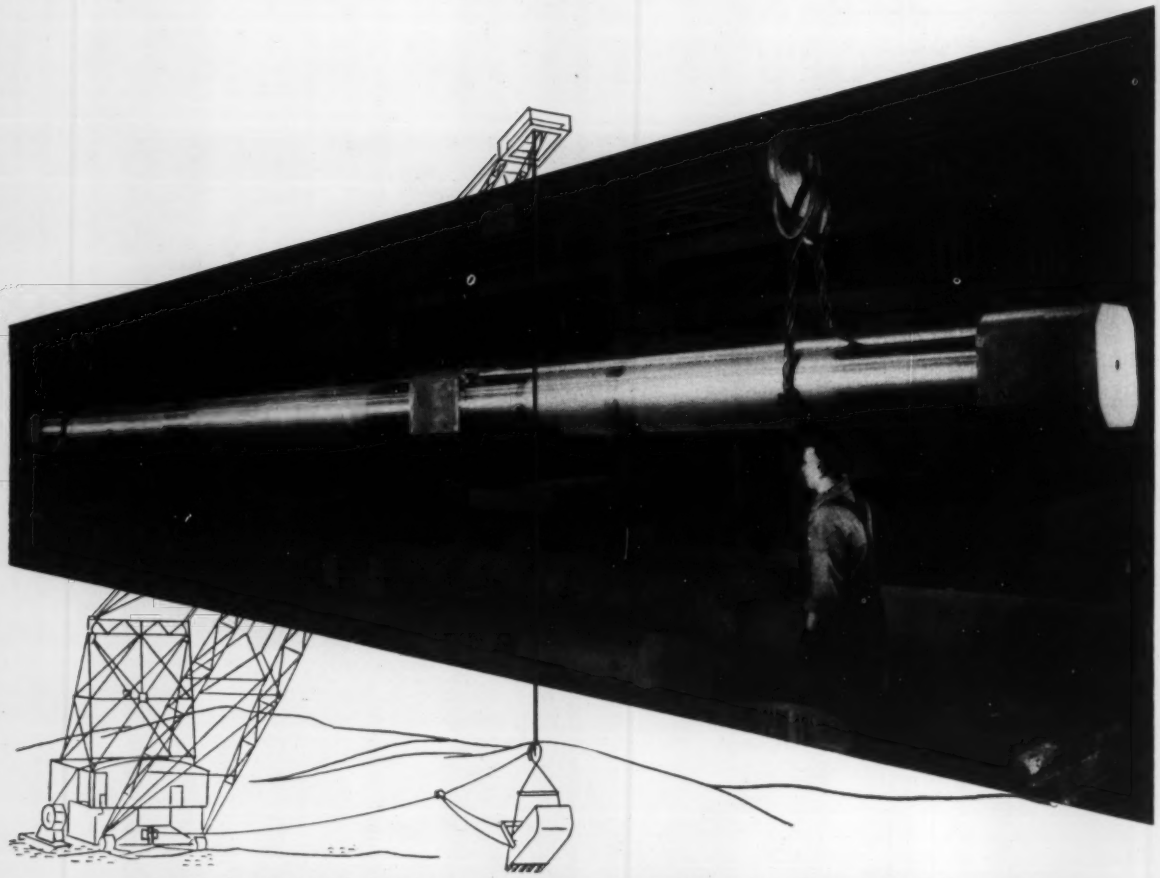

SAVE MONEY with FINKL FORGINGS

Manufacturers of earth moving equipment do!

ELECTRIC FURNACE STEELS • DIE BLOCKS • FORGINGS • HOT WORK STEELS •

Walking draglines are ingenious, mobile monsters employed for digging and moving earth. Because of their size and applications, often in isolated areas, they must be dependable and steady in their operations. Only the best materials and workmanship will prevent costly downtime in the field.

Many of these machines employ Finkl forgings. The 48 foot "walker" shaft shown above transfers power from the engine to the walking mechanism of the dragline to move as much as 450 tons of equipment. Here the best materials and craftsmanship will prove the least expensive in the long run.

For over 78 years, Finkl has produced the best in cylinders, spindles, driveshafts, and special forgings both rough turned and finish machined. When you are considering forgings or die blocks, call your local Finkl representative.

A. Finkl & Sons Co.

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COLORADO SPRINGS · SAN FRANCISCO · SEATTLE · BIRMINGHAM · KANSAS CITY
Warehouses in: CHICAGO · BOSTON · LOS ANGELES

Elyria Foundry Sold

Chromalloy Corp. will operate it as a division. Purchase price about $2 million

CHROMALLOY CORP., White Plains, N. Y., has acquired the Elyria Foundry, Elyria, O., from Industrial Brownhoist Corp., Bay City, Mich. Reported price: About $2 million.

Elyria Foundry will operate as a division. Howard C. Gollmar will be executive vice president in charge of the new facility.

Established 56 years ago, Elyria Foundry produces large gray iron castings for the machine tool industry. Chromalloy specializes in the treatment of ferrous and other metals with a gaseous diffusion process which increases their resistance to abrasion, corrosion and oxidation.

GE Buys Ohio Plant

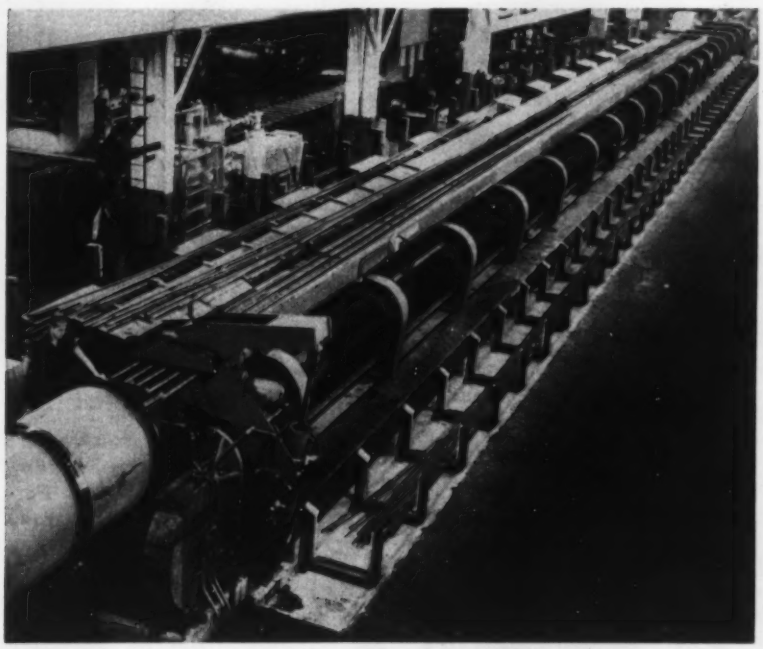
General Electric Co., Schenectady, N. Y., is purchasing Electric Auto-Lite Co.'s plant at Evendale, O. The property consists mainly of two manufacturing buildings containing 3.3 million sq ft of space. It will be operated by the Aircraft Gas Turbine Division. The purchase is part of GE's plant expansion and improvement program which this year alone will exceed $170 million.

GE's Medium Steam Turbine, Generator & Gear Department has leased some 270,000 sq ft of manufacturing space in a Lynn, Mass., plant for the production of marine propulsion equipment.

GE has completed its $27-million, three-year program to consolidate its Direct Current Motor & Generator Department at Erie, Pa.

To Increase Turbine Output

Westinghouse Electric Corp. plans to increase production at its small turbine department, Lester, Pa., through a major rearrangement program. About 50 new machine tools will be installed, ranging from a 132-in. horizontal broach to 1½-in. bar-type turret lathes.



This Tube Drawbench Is 400 Ft Long

Recently installed in the Cleveland mill of Chase Brass & Copper Co., this machine is said to be the longest in the brass and copper industries. It will draw five tubes at a time to a maximum length of 210 ft. Operating speeds vary between 110 and 330 ft per minute

Fabricator To Triple Output

Northeast Metals Industries Inc. has retained Karp, Lesser & Co. Inc., New York, to design and engineer the layout of its newly acquired plant in Philadelphia. The consulting firm also will advise on the purchase of new equipment and provide for effective quality control and material handling at this sheet metal fabricating facility. Northeast expects to triple its output when the 26,000 sq-ft plant starts operations.

AMC Buys Equipment

American Motors Corp., Detroit, is adding nearly $4 million worth of tools and equipment to its Kelvinator Division's main appliance plant at Grand Rapids, Mich. The largest expenditure (more than $725,000) is for a 19-station welding and forming machine which will be about 150 ft long—it will be made and installed by United Welders Inc., Bay City, Mich. Some equipment included in the 1957 improvement budget has been installed. In operation are new equipment for manufacturing Rollbond aluminum evaporators; new aluminum anodizing equipment; and an automatic, Styrofoam enrobing process for insulating evaporators.

Expands Two Steel Warehouses

Service Steel Division, Van Pelt Corp., Detroit, completed construction of a warehouse at 3239 E. 46th St., Los Angeles, Calif. The 25,000 sq-ft building doubles the division's capacity in Los Angeles Service Steel has completed expansion of its Buffalo warehouse, increasing space by almost 50 per cent. A new office building at Buffalo also has been completed.

Boosts Steel Plant Capacity

H. K. Porter Company Inc. has authorized improvements at the Connors Steel Division's works at Huntington, W. Va., that will increase productive capacity 50 per cent. The program includes a new reheating furnace with new mill hot beds, the addition of three rolling mill stands and major im-

35% NICKEL

DURALOY

15% CHROMIUM

Furnace Castings

Here are two good examples of our work in high-nickel castings!

These are in the Duraloy HT group calling for Ni 33.37 percent. We've gone as high as 68% nickel on some castings where extremely high temperatures and very severe corrosive conditions had to be resisted. The important factor concerning castings for exceptionally high temperatures is that they must retain their structural form under load.

Knowing just how much nickel to put in and how much chromium and other alloying elements depends to a large extent on experience . . . and it is experience that we can offer you for the castings you need. We've been producing static castings since 1922 and centrifugal castings since 1933, being among the pioneer founders in each class.

If you would care to have our metallurgist study your casting problem, we shall be glad to have you call upon us for the service.

Our New General Catalog is yours for the asking.

THE DURALOY COMPANY

OFFICE AND PLANT: Scottdale, Pa.

EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.
DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.
CHICAGO OFFICE: 332 South Michigan Avenue
ATLANTA OFFICE: 76—4th Street, N.W.

provements of equipment. Estimated cost: $2 million.

The firm also plans the construction of a plant at Union City, Tenn. It will manufacture electric switch gear protective devices and transformers. Both programs are expected to be completed by mid-1958.

Borg-Warner Spends Millions

Borg-Warner Corp., Chicago, will spend $26 million for expansion this year. The largest amount, about $6.5 million, will be spent to complete a new chemical plant at Washington, W. Va. Another $5 million to $6 million has been earmarked for Chicago area facilities, including the new Research Center at Des Plaines, Ill.

Adds Laboratory Space

American Smelting & Refining Co., New York, is expanding its central nonferrous metal research laboratories at South Plainfield, N. J., by one-third. More than 20,000 sq ft of space is being added. With the new facilities, the firm will produce and study high purity metals, do research on refractory metals (such as rare earths and other high temperature materials) and application and process work on asbestos.

Builds Screw and Bolt Plant

Pittsburgh Screw & Bolt Corp., Pittsburgh, is building a new plant near Scottdale, Pa. Containing about 300,000 sq ft, the facility will manufacture and stock a complete line of bolts, nuts, screws, rivets and other industrial fasteners.

Nylock Licenses Two Firms

Nylock Corp., Paramus, N. J., licensed Lamson & Sessions Co., Cleveland, and Guest, Keen & Nettlefolds, a British firm, to make its patented self-locking screws and bolts.

Will Stock Kaiser Aluminum

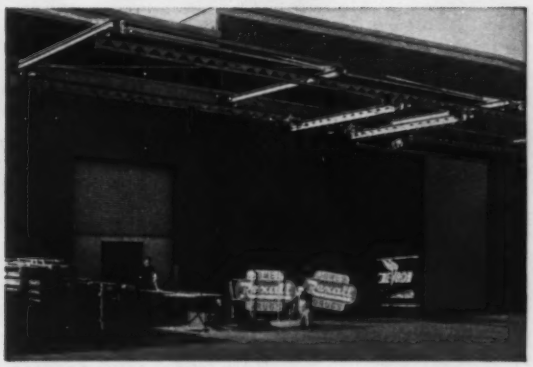
U.S. Steel Supply Co., Cleveland, has taken on the full warehouse line of aluminum products made by Kaiser Aluminum & Chemical Sales Inc. and will soon market

Trambeam Handles it Overhead

Heavy materials move from receiving and through production rapidly via Trambeam. Loads up to 15 tons travel above traffic, save valuable floor space. Track, carriers and motor drives are engineered in a range of sizes to accommodate present needs — have the desired flexibility to meet future expansion. No fumes, jammed aisles or dangerous floor traffic when Trambeam does the job!

Production Flows Smoothly

Trambeam installations are engineered to your specific requirements . . . monorail (as shown above) for point to point transport or crane for complete area coverage. Trambeam is the most efficient method of handling materials and products and the most economical!



Trambeam flexibility is a great advantage in handling materials outside the plant as well as inside. A sign company, for example, moves their products via Trambeam from raw steel through fabrication onto shipping dock as shown above.

in and out of the plant

WHITING

SEND FOR TRAMBEAM CATALOG

This 24-page Booklet gives complete information on custom engineered Trambeam Overhead Handling Systems. Photos of many installations. Write today to

WHITING CORPORATION
15643 Lathrop Avenue, Harvey, Illinois

Manufacturers of Cranes; Trambeam Handling Systems; Trackmobile, Foundry, Railroad and Chemical Processing Equipment

"Untouched by human hand," cams for road building machines are shaped out of solid steel by this DoALL machine . . .

Better Roads for Better Living . . .

Alarmed by the sluggish flow over traffic-jammed arteries that interconnect farm and village and port and industrial center, Government has launched a gigantic road building program. In this action Federal and local governments are assuming a traditional and essential role of serving the interests of all the people.

But government gives nothing it does not first take away. The people pay for the roads. They will get good value for their money because of the remarkable road building "tools" created by private industry. Giant earthmoving machines scoop out loads that would take 1000 men with hand shovels. Paving machines unroll ribbons of highway at a mile a day or more.

These roadbuilding tools are created by machine tools that turn out metal parts fast at low cost. The DoALL band machine illustrated is shaping out cams for road machine mechanisms. The operator uses a control knob to guide the cam blank as it is shaped by the continuous-cutting saw band. It cuts the cam out of solid steel in 5 minutes. This is ⅕ to ⅒ the time required by older machining methods which whittle the metal away a chip at a time.

"Tools" like these create superb roads at a cost taxpayers can afford . . .

New and better tools, such as the DoALL, are the real source of better roads and better living for Americans.

Reprints available for your employees.

DoALL maintains a sawing research laboratory to help you determine the feasibility of band machining for any specific operation. Call DoALL locally, or write:

The DoALL Company
Des Plaines, Illinois
38 Local Sales-Service Stores

E-13

them in Ohio and southern Michigan. For the first time, the warehouse will also stock a broad range of cold-finished seamless mechanical steel tubing. Charles L. Luikart, formerly with Kaiser, is in charge of aluminum sales for the Cleveland district.

Crucible Opens New Warehouse

Crucible Steel Co. of America, Pittsburgh, opened a new specialty steel warehouse and sales office at 6033 E. Bandini Blvd., Los Angeles. It's said to be the largest specialty steel warehouse west of the Mississippi. R. M. Simpson is manager.

Reveals Boron-10 Production

Hooker Electrochemical Co., Niagara Falls, N. Y., is producing 20 lb of boron-10 per week. Used in the atomic energy industry, this metal is valued at three times the price of refined gold. The AEC approved the lifting of information restrictions on Hooker's plant at Model City, N. Y., where the production of boron-10 has been under way since June, 1954.

Installs Hot Scarfing Machine

Installation of a hot scarfing machine is under way at the Steubenville, O., works of Wheeling Steel Corp. This work at the 45-in. slabbing mill will cost about $1.7 million. It's part of a $9-million modernization program at Steubenville.

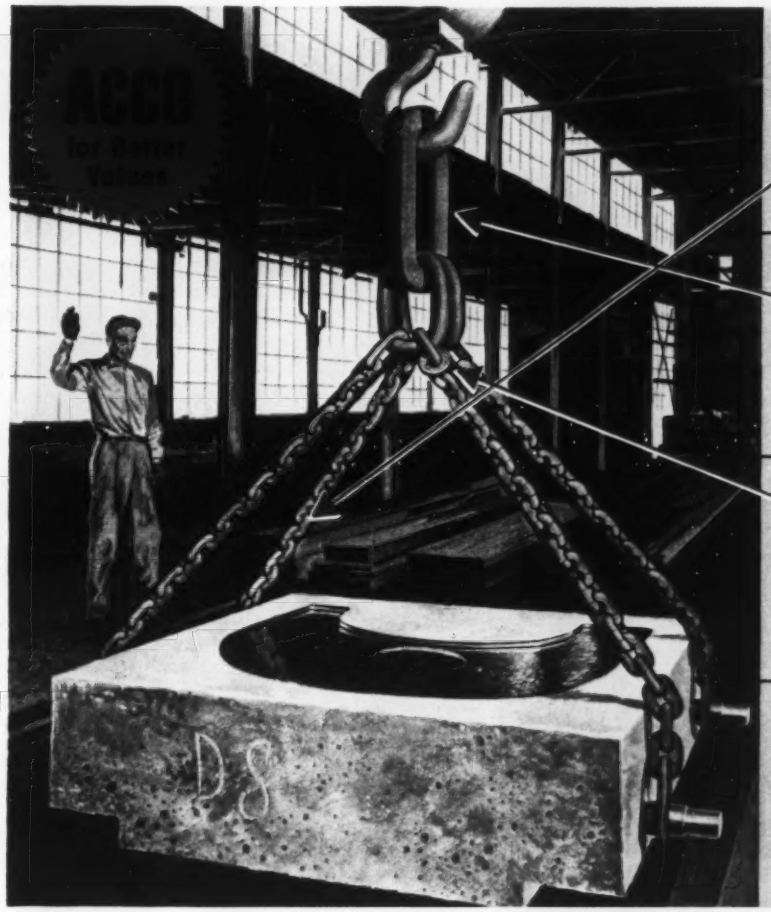
Clark Equipment Opens Branch

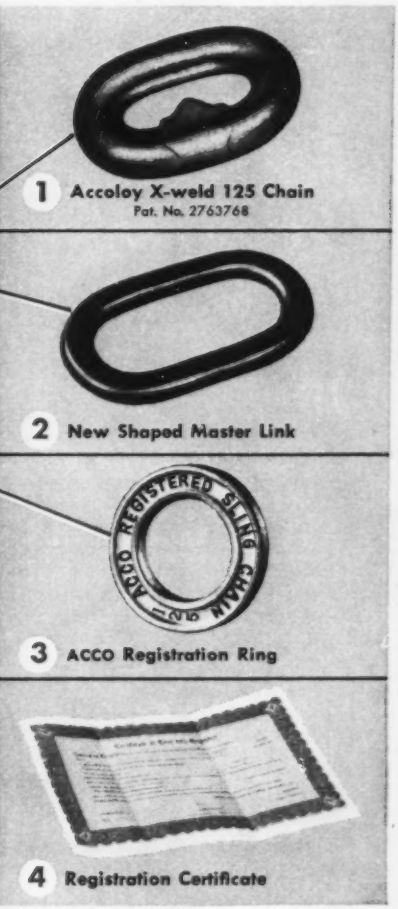
Clark Equipment Co.'s Industrial Truck Division, Battle Creek, Mich., established a factory sales and service branch at 712 11th Ave., New York, N. Y. The company makes fork lift trucks and other material handling equipment.

Diamonite Opens Laboratory

Diamonite Products Mfg. Co., Canton, O., opened extensive research laboratory, product development and pilot production facilities near its recently occupied manufacturing plant. Diamonite

(*Please turn to page* 85)




1 Accoloy X-weld 125 Chain
Pat. No. 2763768
2 New Shaped Master Link
ACCO REGISTERED SLING CHAIN
3 ACCO Registration Ring
4 Registration Certificate

You get all these "plus values" in Acco Registered® Sling Chains

• When you equip your plant with ACCO *Registered* Sling Chains, you are getting slings of such *proved safety and efficiency* that they are the standard by which all other slings are judged! And, in addition, you get all these important, exclusive "plus values":

1 Accoloy X-weld 125 Chain · Where extra strength is desired in an ACCO *Registered* Sling Chain, the patented new Accoloy X-weld 125 Chain is used. Its king-sized welded area and non-kinking feature assure greater ruggedness and better service at no increase in price.

2 New Shaped Master Link · ACCO engineers have created the new Shaped Master Link which, without any increase in weight, holds its form under loads up to 18% greater than a standard round section can. This means extra security for your loads.

3 ACCO Registration Ring · The presence of this serially-numbered ring on an ACCO *Registered* Sling Chain shows that each component has been tested before assembly . . . that the assembled sling has been proof-tested to twice its working load limit . . . and that all tests have been successfully passed before registration of the complete sling and shipment from the factory.

4 ACCO Registration Certificate
Every buyer of an ACCO *Registered* Sling Chain is furnished with a Registration Certificate signed by American Chain & Cable Company, Inc. This Certificate gives assurance that the sling meets ACCO's severe requirements of quality and proof-tested performance, and that it has been individually registered on ACCO's permanent records.

Tops in safety and strength

ACCO *Registered* Slings, with *Magnaflux-tested hooks*, give the best in strength, safety, service—and long-range economy. They are available through ACCO *Registered* Sling Chain Distributors in principal industrial centers. For full data, write us at York, Pa.

WHAT "ACCO REGISTERED" MEANS

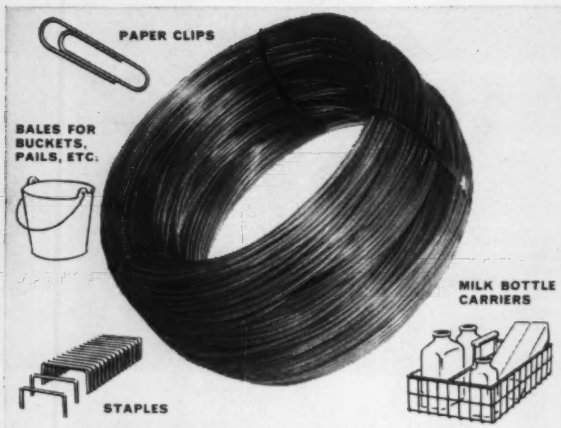
1. The best material
2. Unit safety factor (on bodies, rings, links, hooks)
3. Proof test of complete sling to twice the working load limit
4. Actual field service test of each design
5. Metal identification ring on each sling
6. Signed Registry Certificate with each sling

American Chain Division
AMERICAN CHAIN & CABLE
Bridgeport, Conn. • Factories: *York and *Braddock, Pa.

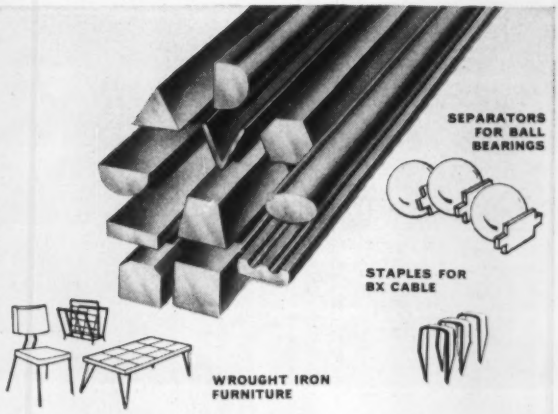
Sales Offices: *Atlanta, Boston, *Chicago, *Denver, Detroit, *Houston, *Los Angeles, *New York, Philadelphia, Pittsburgh, *Portland, Ore., *San Francisco

Indicates Warehouse Stocks

ACCO TRADE MARK



ROUND WIRE—Sizes and finishes to meet almost any specification—$\frac{9}{16}$" on down, in coppered, tinned, bright, galvanized, and other finishes. Made with exactness and uniformity to insure excellent forming and workability. Mill catchweight coils up to 600# or single length Econo-Coils up to 3000# can be supplied, depending on quality, finish and gauge.

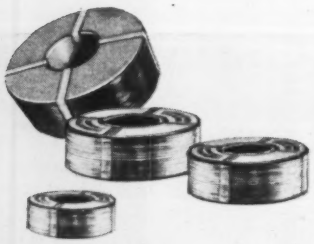


STANDARD AND SPECIAL SHAPES—Cut costs where it counts most—on forging, stamping, rolling and machining for moldings, product trim or other fabrication. Many shapes and sizes are available—V-shaped, oval, square, rectangular, keystone-shaped, and others. It will pay you to check their many cost-saving possibilities.

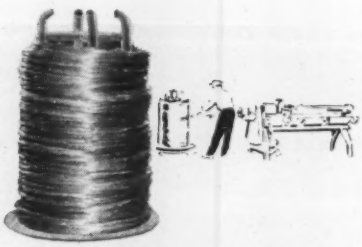
You can do it BETTER at LESS COST with...

CONTINENTAL® WIRE

In practically any size, finish, temper or analysis in low and medium low carbon steels



FINE AND SPECIALTY WIRE Staple wire, tag wire, shoe wire, florists wire, pin wire, coil binding wire—an almost endless list of fine wire for special application. Many finishes, tempers and sizes.



ECONO-COIL Continuous length wire coils of 2000# to 3000# catchweight, in sizes from 12 gauge through ½" diameter. Reduces scrap loss up to 90 percent. Shipped on returnable Econo-Coil pallets.

LEVERPAK—FOR FASTER, CLEANER WIRE HANDLING

Saves scrap, reduces down time. Protects wire from moisture, dirt, and the damage of ordinary handling. Permits long, uninterrupted runs of 500# to 650#. Easy to ship and store.

Send today for Data on Wire

Profit by our thousands of case histories that may point the way to significant savings for you... with Continental Wire.

Wire Specialists for over Half a Century

CONTINENTAL

STEEL CORPORATION • KOKOMO, INDIANA

PRODUCERS OF: Manufacturer's Wire in many sizes, tempers, and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright and special shaped wire. Also Welded Wire Reinforcing Fabric, Nails, Continental Chain Link Fence, and other products.

(*Concluded from page* 82)

specializes in the manufacture of high alumina ceramic components for electronics, wear, corrosion and heat-resistant parts, oxide cutting tools and high density grinding media.

Will Develop Missouri Ore

Granite City Steel Co., Granite City, Ill., and American Zinc, Lead & Smelting Co., St. Louis, have launched a joint venture to explore ore fields within the state of Missouri. The agreement contemplates the development of mining properties for the use of both companies in the event that any commercial ore discoveries are made. The operation of any properties that may be developed will be handled by American Zinc.

Plans California Division

Cadre Industries Corp., Endwell, N. Y., will open a division in the Los Gatos, Calif., area. It will manufacture cables, cable harness, electronic units and panels. F. J. DuBois has been appointed vice president in charge of manufacturing and assigned to establish the new division.

Clark Controller Buys Plant

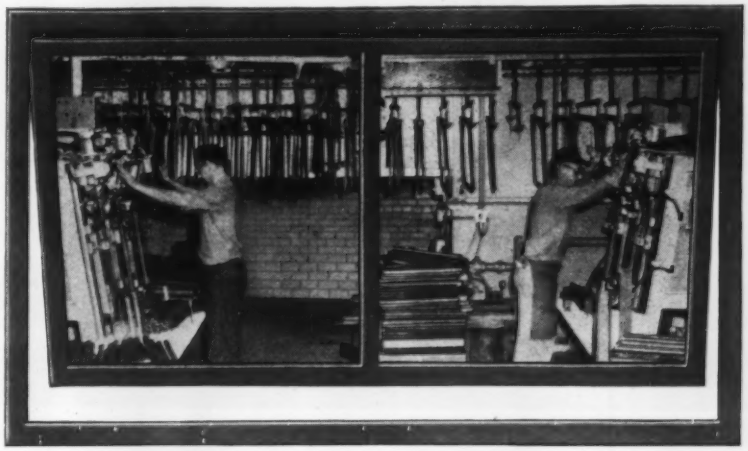
To expand manufacturing and warehousing capacity, Clark Controller Co. bought a 170,000 sq-ft building in Cleveland from Western Electric Co. and Ohio Bell Telephone Co. Purchase price was $650,000. The Cleveland firm makes electrical control components and systems.

Firm Changes Name, Expands

Auto Sheet Metal Works, Los Angeles, manufacturer of material handling and printers' steel equipment, will change its name to Trojan Metal Products as of Apr. 10. The company has added a second plant, which contains 10,000 sq ft.

Makes Oil Well Tubing

Standard Tube Co., Detroit, will produce oil well tubing. Upsetting, threading and testing equipment has been installed in the lat-



RESISTANCE HOT-HEADING CASEMENT WINDOW UNITS

Production . . . . . Up 40%
Unit Labor Cost . . . . Down 50%
Inspection . . . . . Eliminated
Morale . . . . . Improved

Production of steel window frames and sash was increased by 40% and labor costs cut in half when the U. S. Gypsum Co., Warren, O., installed two Taylor-Winfield resistance welders to join parts of the two assemblies. Because of the consistent quality of the hot upset joints, the firm reassigned an inspector who formerly checked the sash and frame sections. Officials also report improved worker morale and less fatigue due to eliminating noisy air hammers that previously cold-headed the sash and frame joints.

In this streamlined assembly operation, one machine joins frames and the other joins sash. The operators place the frame and sash parts in position, where they are automatically clamped. Pairs of frame and sash go through further processing together. Adjustable tooling permits assembly of all sizes of frame and sash manufactured by U. S. Gypsum.

SEE OUR BOOTH 400
5TH AWS WELDING SHOW
April 9-11, '57
CONVENTION HALL
PHILADELPHIA, PA.

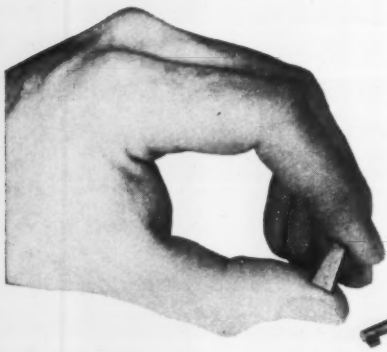
Finding means of increasing your production and lowering your fabrication costs is Taylor-Winfield's business. Contact the nearest T-W office

The TAYLOR·WINFIELD Corporation
WARREN, OHIO

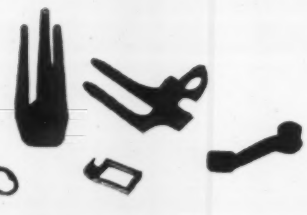
ELECTRIC RESISTANCE AND ARC WELDING MACHINES
Sales and Service
CHARLOTTE • CHATTANOOGA • CHICAGO • CLEVELAND • DALLAS
DAYTON • DENVER • DETROIT • LOS ANGELES • PHILADELPHIA
PORTLAND, OREGON • SEATTLE • ST. LOUIS • STAMFORD
OAKVILLE AND WINDSOR, ONTARIO

Wanted: an economical material that can be used for products regularly made in sizes of *less than an ounce* and *up to 150 lbs.* The material must have toughness and ductility, high yield strength and impact resistance, and excellent machinability.

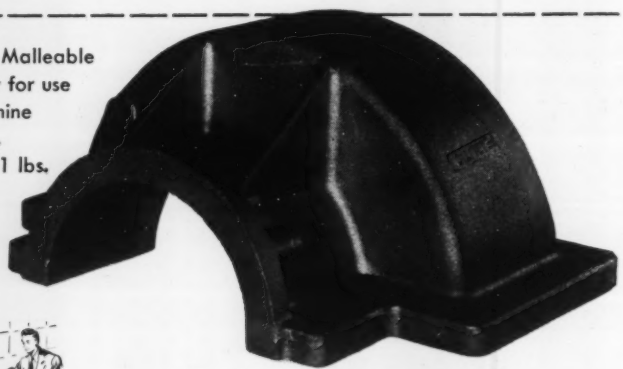
How about Malleable?



Typical examples of malleable castings that barely tip the scales.



A Pearlitic Malleable gear cover for use in 15 ton mine locomotive. Weight 111 lbs.



Many design problems—including even heavier parts—can be solved with malleable iron when you understand its widely versatile possibilities. Call a malleable foundry for information and suggestions, or write to the Malleable Founders' Society.

Malleable FOUNDERS' SOCIETY

1800 Union Commerce Building Cleveland 14, Ohio

est addition to the plant at 24400 Plymouth Road. An additional electrical resistance welding mill is being installed. The firm makes carbon steel electricwelded mechanical tubing, heat exchanger and boiler tubing; and stainless steel mechanical and pressure tubing and pipe.

A-C Forms Nuclear Division

Allis-Chalmers Mfg. Co., Milwaukee, has organized a Nuclear Power Division to broaden the development of skills and equipment for the use of atomic energy.

Division Ups Capacity

Republic Steel Corp.'s Union Drawn Steel Division, Massillon, O., is increasing its productive capacity for carbon corrected annealed steels. A fourth continuous carbon correction annealing furnace is being installed. It anneals steel bars and restores surface carbon burned out by hot working operations.

Stelco Will Triple Lab Space

Steel Co. of Canada, Hamilton, Ont., has begun construction of a $1.4 million metallurgical and chemical laboratory. It will triple space available for research.

New Plant in Operation

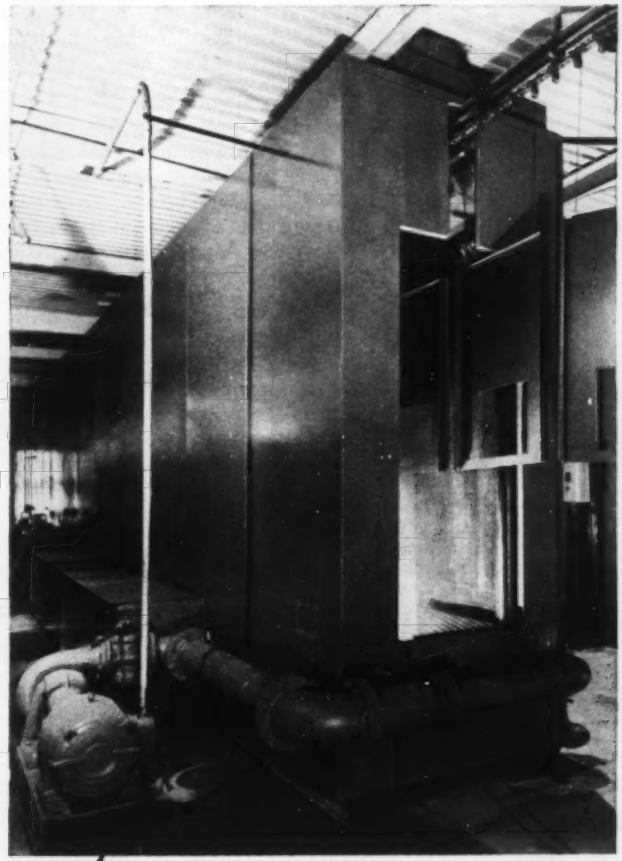
American Coils Co. is operating its new plant at Farmingdale, N. J. The firm makes heat pumps and air conditioners.

Expansion for Research

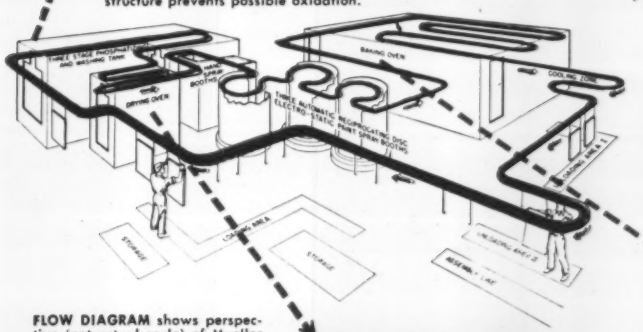
Babcock & Wilcox Co., New York, will expand its research center at Alliance, O. It does work on nuclear engineering.

ASSOCIATIONS

Gustav Schwarz, president of Connor Spring Mfg. Co., San Francisco, has been elected president of **Pacific Spring Manufacturers Association,** that city. Other officers are: Vice president, Prosper Deprez, All American Spring Co., Los Angeles; secretary-treasurer,



THREE STAGE cleaning and phosphatizing unit is 88 ft. long. Here, metal parts are detergent-washed, chemically treated to convert the surface of the metal to an iron-phosphate coating, rinsed and sprayed with a dilute chromic, phosphoric acid solution. The phosphate coating prevents rust and corrosion from creeping under paint at points of future wear or damage. The chromic film over the phosphate structure prevents possible oxidation.



FLOW DIAGRAM shows perspective (not actual scale) of Mueller Climatrol's new metal processing and paint finishing conveyor system. Conveyor is 1300 ft. long; travels 15 ft. per minute. Parts are completely processed through entire system in one hour. Now, 10 men in 40 hours a week do what 24 men used to do in 50 hours.

DRY-OFF OVEN is gas fired. All moisture is baked out in three passes at 200° F., for three minutes. Parts move from here through hand spray operation (required on only 1% of the jobs) to automatic electrostatic spray booths where all colors of paint, including black and aluminum, are applied.

BAKING OVEN is located outdoors adjacent. There wasn't enough floor space or ceiling height in the finishing department. 300 ft. of conveyor in the gas-fired oven gives a 20 minute bake in five passes. Temperature is automatically controlled, recorded and maintained at 310° F.

DESPATCH

finishing equipment helps Mueller Climatrol make a fast switch from

TWO SHIFTS TO ONE SHIFT

with no lost production!

Painting was a bottleneck at the Mueller Climatrol Division, Worthington Corporation, Milwaukee, Wis.

They had to run two shifts, each 50 hours a week, and had a hard time keeping up on furnace casings and an increasing amount of air conditioning components.

Now they're running one shift, 40 hours a week, thanks to a new system (see flow diagram) that was put into action smoothly and quickly with no lost time . . . no lost production.

Despatch helped by designing and fabricating the washing and phosphatizing machine . . . the gas-fired dry-off oven . . . the spray booth enclosures . . . and the giant baking oven.

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(Advertisement)

Udylite Builds Largest Plating Installation On West Coast

Rheem Automotive Company greatly increases production capacity for automobile bumpers in completely new plant.

IN an orange grove setting, near Fullerton, California, Rheem Automotive Company now has in operation the largest plating installation on the West Coast. It was designed and built by the Udylite Corporation under the supervision of the L. H. Butcher Company Division. Udylite furnished a complete "package" for the cleaning and plating facility.

Rheem manufactures the complete bumper right from panels of high tensile steel. Before plating, these panels are pickled, polished, bonderized, rinsed, formed and then transferred by an overhead monorail system to the plating department. Here in an area the size of a football field the bumpers travel through thirty-one operations.

Upon arrival at the plating department, ten to sixteen bumpers are placed on each rack in a floor level racking area. The racks, mounted on work carriers, are delivered automatically to the Udylite pre-plate unit by the monorail system. This automatic machine is 133′ long x 15′ wide x 22′ high. It operates hydraulically and routes the work through a pre-plate cycle including cleaning, spraying, acid dip and nickel strike.

After the cleaning and surface preparation, the work carriers with their racks of bumpers are delivered selectively to either of the two nickel plating lines where they are then placed in the nickel plating tanks on a predetermined time cycle.

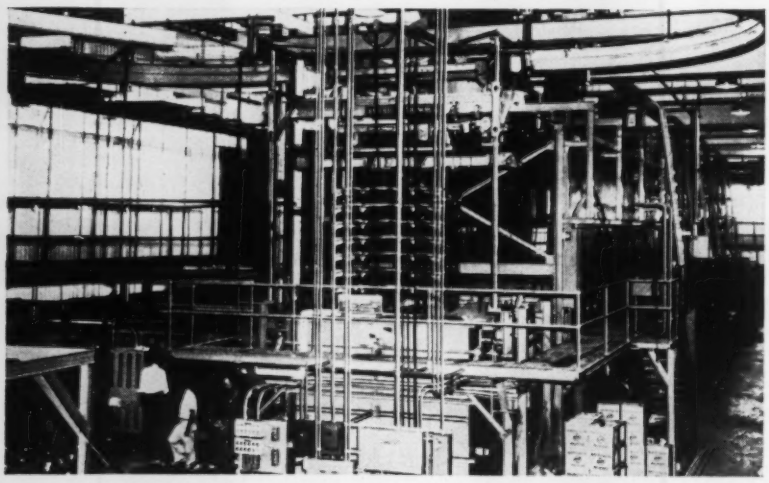
The nickel line consists of two sections, each composed of sixteen tanks; twelve contain nickel plating solutions. Each nickel plating tank has conforming anodes and cathode bar agitation and contains 3,750 gallons of solution which is continuously filtered and heated by heat exchangers. Each tank is powered by a 5,000 ampere, 18 volt Udylite-General Electric Germanium rectifier with automatic stabilized voltage control.

Work carriers are picked up at the end of the nickel line and are transferred to inspection stations by means of the continuous monorail system, prior to final chromium plating.

After inspection, work carriers are automatically delivered to the chromium plating line and handled by a manually operated monorail system through a series of ten cleaning, rinsing and chromium plating tanks.

Then, after chromium plating, the work carriers are automatically picked up and delivered to an unloading area where the plated bumpers are removed for inspection and palletizing.

The new Rheem facilities are said to greatly increase plating capacity for automobile bumpers.



Bumpers loaded on plating racks are automatically transferred through this seventeen tank pre-plating unit giving chemically clean surfaces prior to nickel plating.

Marshall Christen, Los Angeles division manager, Connor Spring Mfg. Co.

Western Reinforcing Steel Fabricators Association has been formed by fabricators in the seven far western states. Headquarters are at 1322 Webster St., Oakland, Calif. F. S. Clough is manager. G. L. Cobb, Soule Steel Co., San Francisco, is president.

A. R. Walkley, general manager, Manning, Maxwell & Moore Inc., Muskegon, Mich., is president of the newly organized **Hoist Manufacturers Association Inc.** M. L. Aitken, general sales manager, Robbins & Myers Inc., Springfield, O., is vice president. J. H. Peritz is executive secretary and treasurer. Offices are at One Thomas Circle, Washington 5, D. C.

Institute of Scrap Iron & Steel Inc., Washington, appointed Irving Shapiro, Ashland Iron & Steel Co., Chicago, chairman of its subcommittee on specifications.

Associated General Contractors of America, Washington, elected these officers: President, L. C. Rogers, Bates & Rogers Construction Corp., Chicago; vice president, F. W. Heldenfels Jr., Heldenfels Bros., Corpus Christi, Tex.; secretary-treasurer, William Muirhead, Wm. Muirhead Construction Co., Durham, N. C.

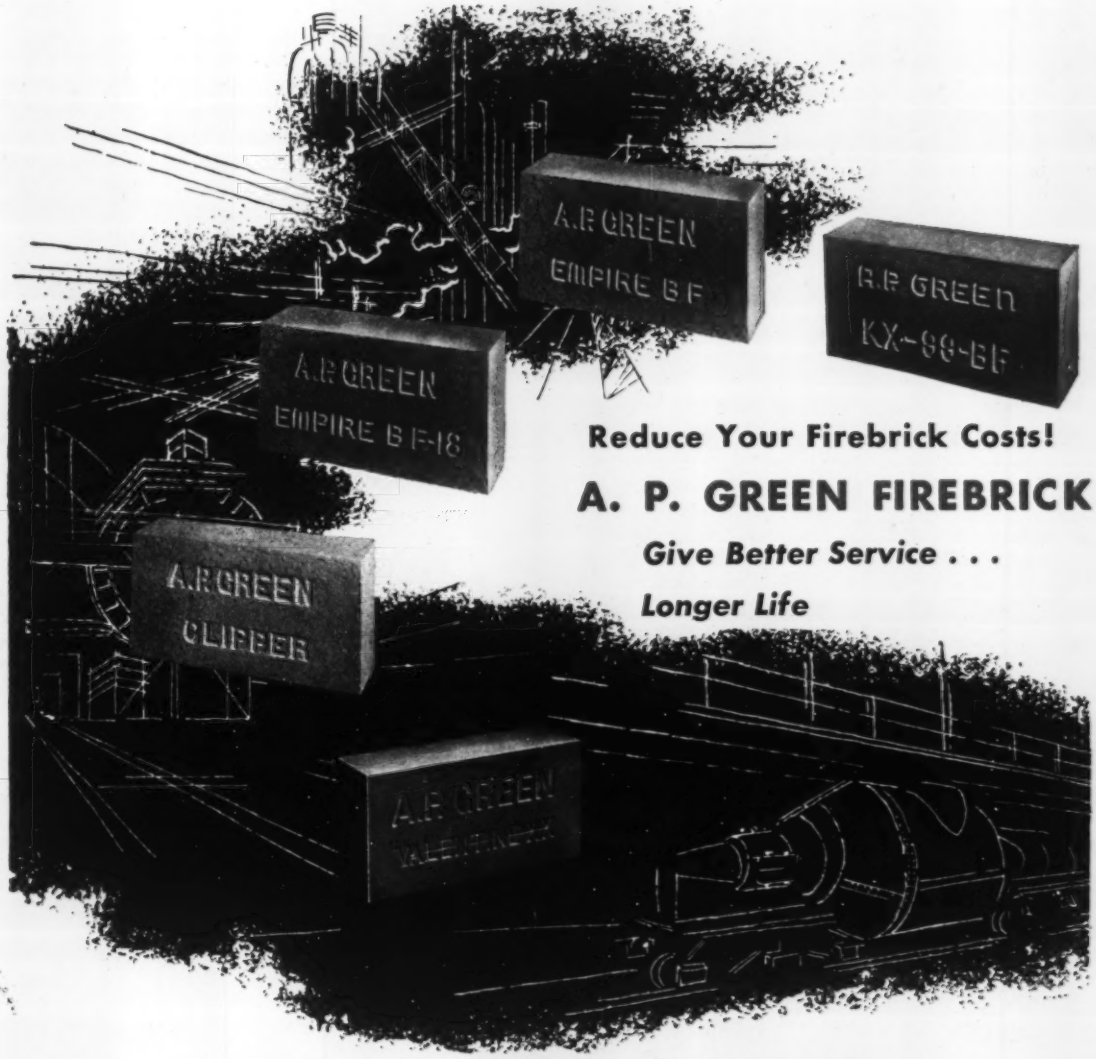
NEW ADDRESSES

Microdot Inc., manufacturer of microminiature coaxial connectors, moved to larger quarters at 22 Pasadena Ave., South Pasadena, Calif.

Clearing Machine Corp., division of U.S. Industries Inc., Chicago, moved its Cleveland office to Room 956, Hanna Bldg., E. 14th and Euclid Ave., Cleveland 15, O. N. L. Mahla is district sales manager.

Beckman Instruments Inc., manufacturer of data and control systems, moved to 325 N. Muller Ave., Anaheim, Calif.

Cutler-Hammer Inc. moved its district sales office to 2312 W. Capitol Drive, Milwaukee, Wis.



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BEARING TIPS by McGill

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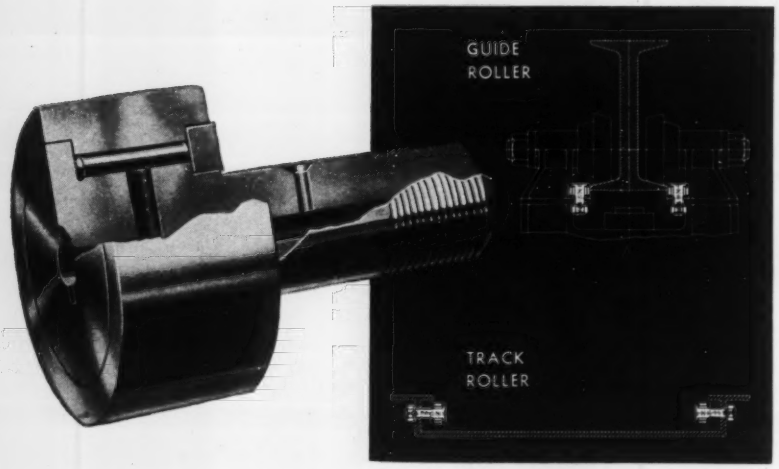

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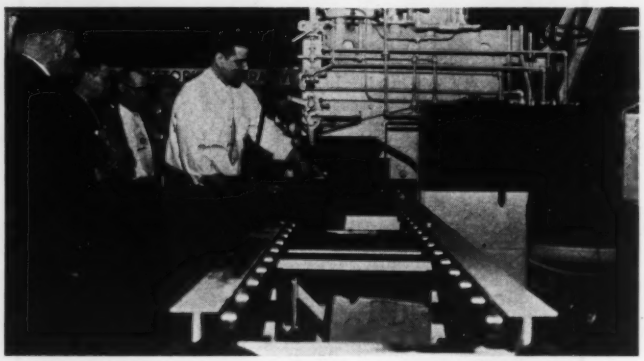
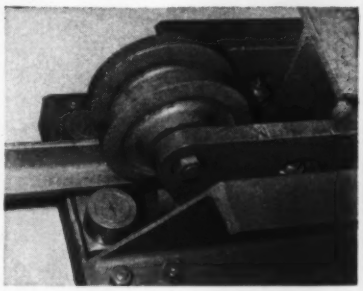
In guide and support roller applications CAMROL Cam Followers insure free rolling action and positive side thrust while eliminating the wear of more costly flanged wheels. Then, too, they provide improved alignment and low starting and running friction with high unit load and shock capacity, especially at low speeds as track rollers. Lubrication is simplified and maintenance can be reduced to a minimum in these applications. Specify the interchangeable sealed SGR series for added protection against contamination.

CAMROL CF bearings provide friction-free track rollers for automatic mold blower



McGill CAMROL CF rollers are used as guide rollers to form a mold conveyor in the Beardsley & Piper MBS-20 Mold Blower. The machine blows and squeezes cope or drag in a single automatic operation, handling up to 4 molds per minute. The CAMROL CF bearings replaced less efficient friction rollers in this application. Although, the duty here is rather light and speeds slow, the cam follower bearing provides lesser starting and running friction. This helps speed the flow of work from the machine, which must be fast and automatic. The integral stud feature eases assembly and its standard design simplifies procurement.



CF bearings minimize maintenance as crane side guide rollers

McGill CF cam follower bearings serve as side guide rollers in overhead cranes manufactured by Louden Machinery Company of Fairfield, Iowa. Freedom from maintenance, a time saver because of the inaccessibility of the bearing when the crane is in operation, is an important advantage of the cam follower bearing.

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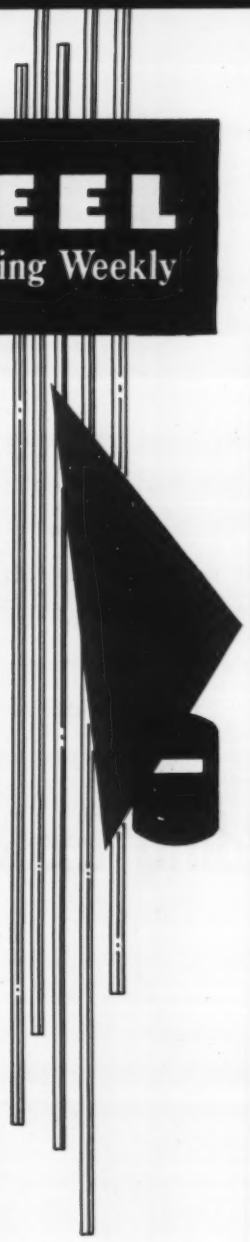

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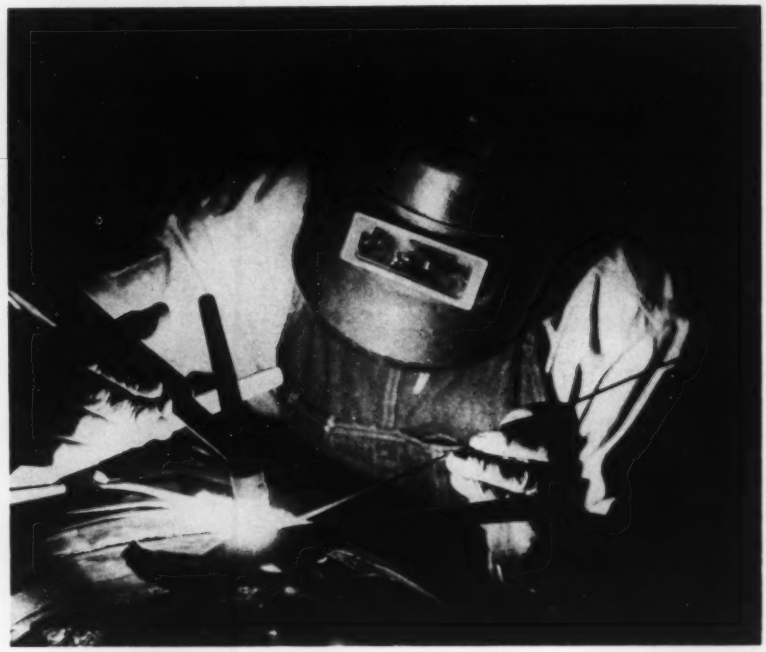


Education, shielding gases to replace flux, automatic welding machines, more research in arc fundamentals vie for attention of top welding engineers. Here's their evaluation

Welding Experts Air Views On Their Industry's Needs

Welding solves atomic age problems like this one. Shippingport (Pa.) reactor vessel (above) was welded and its interior overlayed with stainless. Submerged arc and a special flux did the trick

EDUCATION is the key to the future of welding in the opinion of experts polled by STEEL. They suggest:

- Greater efforts to show the progress that has been made in the joining of hard-to-weld metals.
- More production labs to find new ways to apply welding and to teach the new methods to production men.
- More training in weldment design for engineers.
- More emphasis on the precision of automatic welders.

The experts also think that too much stress is being put on operator skill. They feel that if the industry is to keep pace it must make a bigger effort to make welding less subject to human error—automatic equipment should play an increasingly important role in this effort. Resistance welders also look for important increases because their equipment lends itself to automation.

Many feel the need for more research on welding's variables. Dr. D. C. Smith, the American Welding Society's Adams lecturer (see program, page 103), will tell the results of his research in joining the ultra-high-strength steels.

Don't Miss the Welding Electrode Selector . .

STEEL's editors have prepared a selector (page 98) which will help you choose electrodes by composition, ASTM-AWS specification and manufacturer designation.

The American Welding Society recognizes the significance of weld deposit composition, especially in the alloy grades. Deposits which differ from the basis metal can cause great difficulty in heat treating.

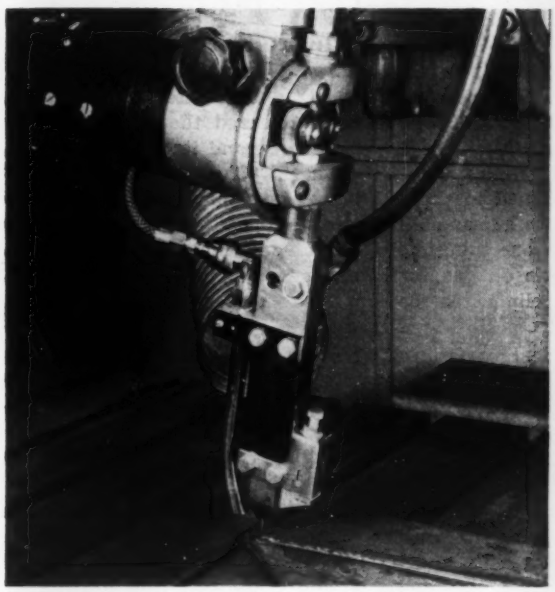
On the front of the selector are the latest data on the proposed AWS suffix codes for electrode specifications. When adopted, they will designate the composition of weld deposits. The codes shown are close to their final form. The society will probably substitute digits for the "XX" designation where possible.

In recognition of the growing importance of the automatic machine, one section of the selector has been devoted to mild and alloy steel electrode wire. In addition, nonferrous and stainless charts indicate those electrodes for which there is a comparable grade of automatic wire.

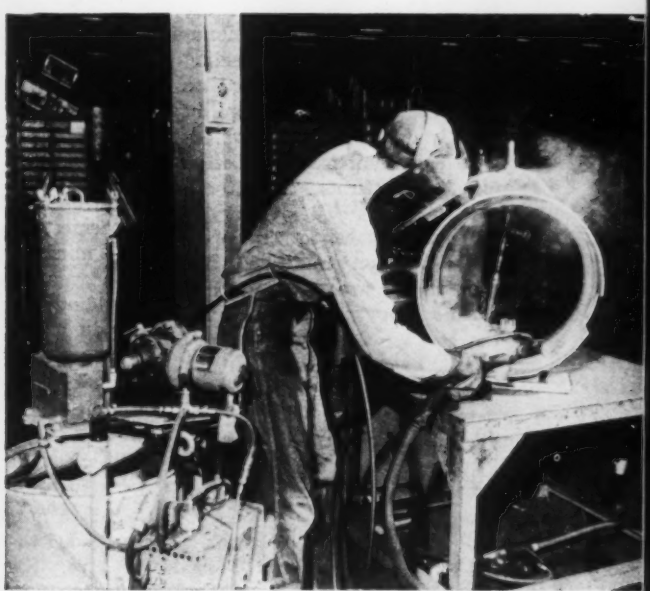
What They Say

J. H. Humberstone, president, Air Reduction Sales Co., New York, would like to see more attention focused on the advances that have been made with metals once considered hard to weld: Aluminum, copper, titanium, zirconium and molybdenum.

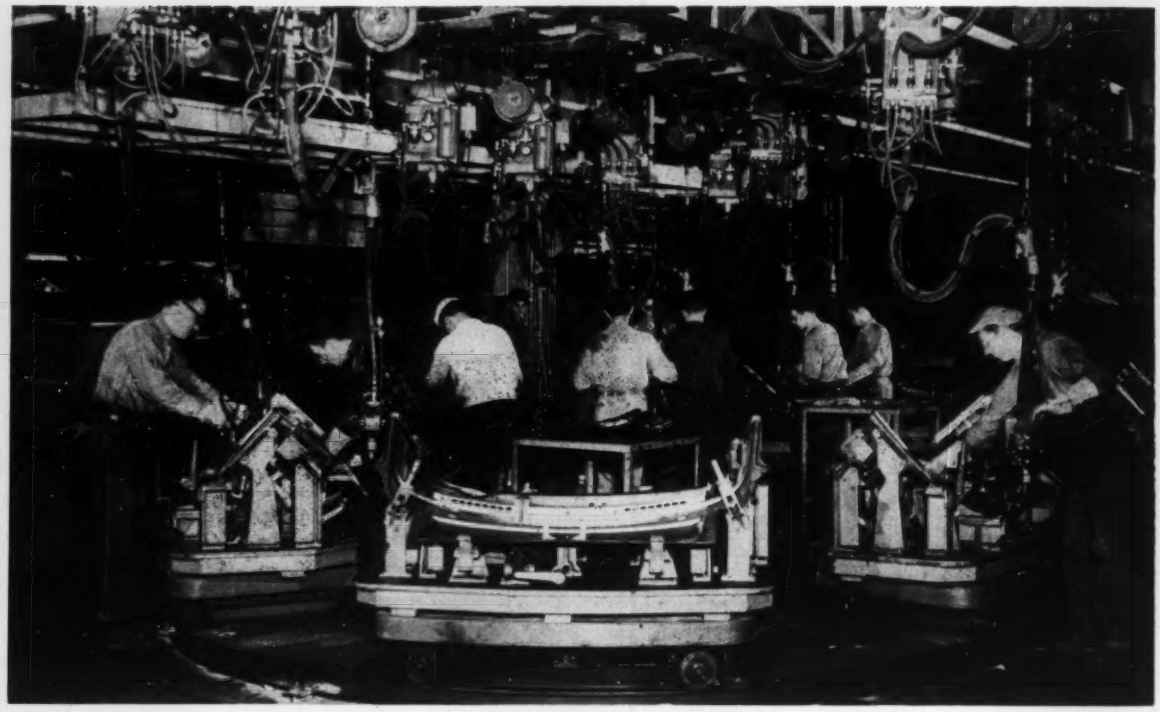
Self - Education — Worthington Corp., Harrison, N. J., has a different approach. Last year, the firm built a 5000 sq-ft welding laboratory and staffed it with graduate engineers. Its main purpose:



This new head for automatic CO_2 welding is air cooled, eliminates water connections. General Electric says spatter build-up is reduced



Linde's new Unionarc will be demonstrated at the welding show. Operator is welding a cable control case. Process features bare wire, magnetized flux and CO_2



Devices like this one (called a merry-go-round) reduce the amount of skill required for joining. Stampings are joined by spotwelders which hang from monorail

EXPERTS AIR VIEWS . . .

Find more ways to use welding, and show production operators how to apply them.

John Mikulak, assistant to the vice president in charge of manufacturing, heads up the welding effort. He thinks: "We need to alleviate the current shortage of properly trained product design engineers. The usual machine design training," he affirms, "is not adequate."

It's commonplace to find weld designs based on tradition. The disadvantages are: Too many welds, too many parts, too much hand welding. A great deal can be saved if parts are designed for joining with an automatic welder.

Mr. Mikulak also believes that considerably more could be done with present methods, equipment and materials if more personnel were available.

Another Facet — J. Heuschkel, consulting welding engineer, Westinghouse Electric Corp., Pittsburgh, and others, are convinced that the "art" of welding should be de-emphasized.

Their point: Because of labor and material expenses, automation will be used more widely to increase general welding efficiency. Fabricators generally would like to be less dependent on the operator's skill.

Support—R. W. Tuthill, supervisor, welding process engineering, General Electric Co., York, Pa., confirms that view.

He says: "The future of welding will be closely allied to those processes which reduce human skill to a minimum." For one thing, he sees greater emphasis on gas for shielding because it eliminates the disadvantages of flux.

J. J. Chyle, president, American Welding Society, and director of research, A. O. Smith Corp., Milwaukee, agrees that gas shielding will show the greatest gains in the near future.

"More automatic equipment will be needed to reduce welding costs," he says. "Carbon dioxide welding, because of its cost advantages and deep penetration, will gain in popularity, replacing some submerged and inert gas welding."

None of the experts felt that the coated electrode would ever be entirely replaced. Growth will continue at a slower pace than that of semiautomatic and automatic processes.

Grass Roots — Taylor-Winfield Corp., Warren, O., recognizes the trend to automate. The firm recently entered the submerged arc field to expand its production line.

Charles Chew, one of the engineers developing the new equipment, proposes a greater effort to teach purchasing agents and businessmen that welding is a complex process.

He reasons: These people see the superficial techniques used in hand welding and fail to realize that the operator is making constant adjustments to overcome changing conditions. So it's hard to convince them that automatic machines add precision.

But the problem doesn't stop there. Mr. Mikulak (Worthington Corp.) notes that it is difficult, if not impossible, for the generally trained technician to keep abreast of developments.

Even people in the welding industry are questioning the state of their knowledge.

More Research—Almost all those polled felt that too little is known about the nature of an arc and its effect on metals. Many of the present metals have been developed without regard to joining.

John Galbraith, manager, Welding Department, Linde Air Products Co., a division of Union Carbide & Carbon Corp., New York, wants researchers to come up with more information about each of the variables. He asks: "Exactly what happens to metal in an arc?" He feels that the lack of such knowledge is one of his biggest problems and a barrier to increased mechanization.

People using metals which must perform well at high temperatures, continues Mr. Galbraith, are demanding better results. Such welds should be as strong as the basis metal.

"We are doing a great deal of work in that area. If you're optimistic, you can say we ought to have a solution in a year or two," he concludes.

Adams Lecture—Dr. Smith, chief metallurgist, Electrode Division, Harnischfeger Corp., Milwaukee, has an answer for welds involving high strength and superstrength metals. He will discuss the results of a four-year project he headed.

They show that practically all the high and ultrahigh strength steels can be welded so that the deposit chemistry matches that of the basis metal. His data also indicate that his company's electrodes can be used under normal service conditions.

In terms of help for fabricators, here is what his work means:

You can buy a group of electrodes which will deposit a weld bead that responds to heat treating in the same way as the basis metal. They can solve problems in repairing cast armor plate, fabricating and joining the high strength (to 210,000 psi) aircraft steels and the ultrahigh strength (to 300,000 psi) steels.

Watch This One — Resistance welding sales were at an all-time high last year.

Despite the rosy picture, some firms are dissatisfied. David Sciaky, president, Sciaky Bros. Inc., Chicago, has often called for greater vision from the builders of resistance welders. His theme: "While selling your machines, sell the potential of the resistance method. Its welds are safe and consistent."

Like the arc welding experts, Mr. Sciaky believes that education is his most pressing problem. He says: "We hope we will be able to convince all resistance welding manufacturers that we need to educate ourselves as well as our customers. We need to catch up with the proponents of competitive methods in this effort."

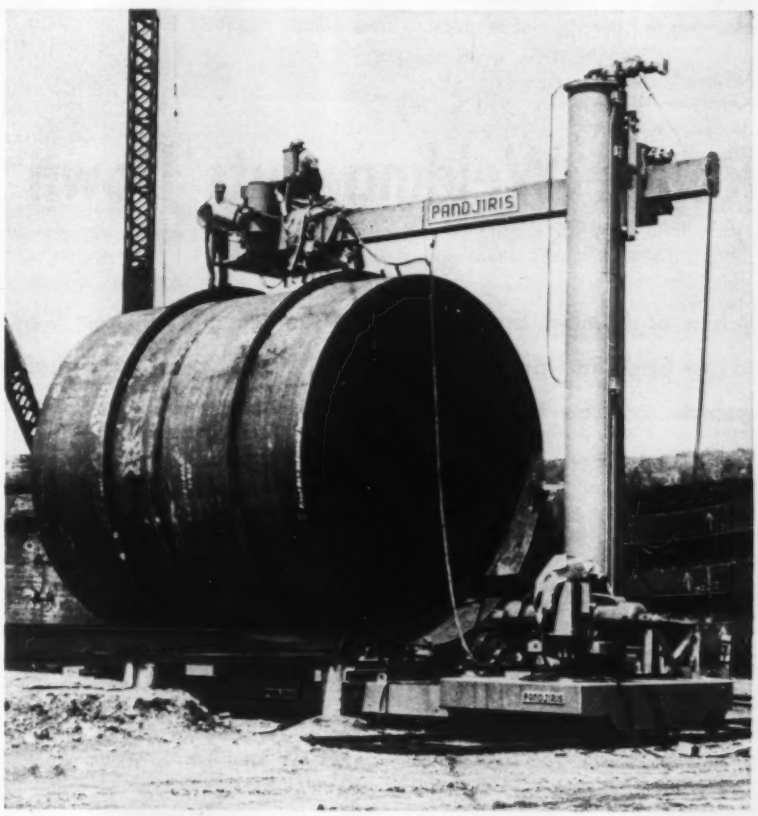
Example—The future of resistance welding does depend greatly on whether machine builders can share the same amount of vision: They must find ways to agree on new applications.

Resistance welding, continues Mr. Sciaky, is a natural, and is well suited to the variety of steels slated for tomorrow's aircraft. "We believe the application of resistance welding to such problems is far simpler than it was for aluminum in the early 1940s."

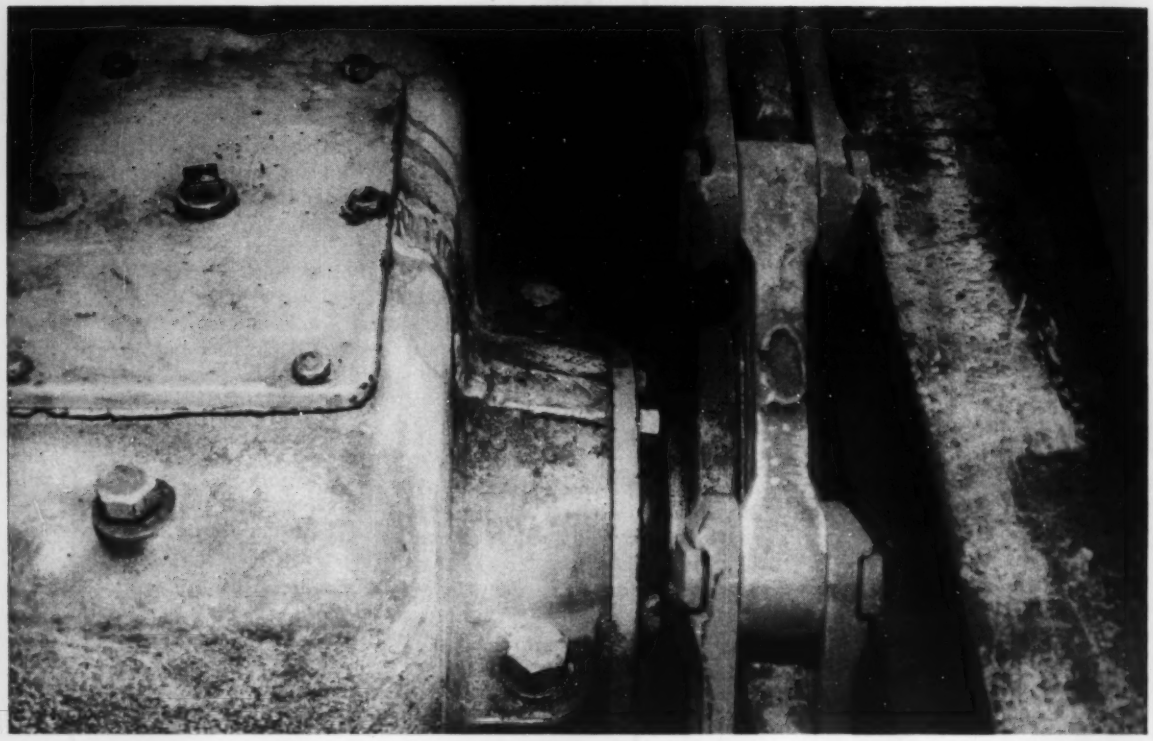
A recent survey of aircraft design engineers indicates that they are quite willing to apply resistance welding to new areas like airframe structural members. Mr. Sciaky feels that it will be a foolish waste of a potential market if welding equipment builders won't back them up.

Research—Sciaky has been operating a pure research facility for the last two years. Its results have been encouraging. Resistance welding can do a great many more fastening jobs than presently realized. In the offing is a spotwelder that will inspect its own welds.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*



Automatic welders like this one are highly versatile and economical to operate. Experts say they'll become increasingly popular



When this main drive housing on a continuous draw furnace cracked because of a frozen bearing, maintenance welders quickly repaired it

Repair Welding Cuts Down Time

When equipment breaks down, often it's the quickest way to get back into production. New items, such as machinery guards, can be fabricated by welding

WELDING is an essential tool in any maintenance program.

Although it is an inherently versatile tool, its range often depends on the ingenuity and experience of the welding supervisor and his men, contends Vincent J. Richilano, assistant superintendent of methods and maintenance at the Cleveland Ordnance Plant, Cadillac Motor Car Division, General Motors Corp., Cleveland.

The more experienced and aggressive the man in charge, the greater the application range, he told participants at the 8th Plant Maintenance & Engineering Conference in Cleveland.

Categories — Maintenance welding falls into three categories:

1. Repair of machinery, equipment and buildings.
2. New and replacement items for in-plant equipment, buildings.
3. Special applications.

Repair—A great deal of know-how is required for repair welding, says Mr. Richilano. When a piece of machinery breaks down because of a cracked base, broken frame or other damaged part, welding often will enable you to make the repair in a matter of hours.

Usually, the material is a gray cast iron, Meehanite, cast steel, low or high alloy steel, brass, bronze or aluminum. When making such repairs (regardless of materials) consider these points:

1. Warpage—Determine the dimensional stability required during welding and afterward. In many cases, warpage or distortion will not allow the equipment to function properly. Preheating before welding, postheating and slow cooling, use of alignment bars, dowel pins or other devices will minimize warpage.

Some repairs will require machining after welding to give absolute straightness. Sometimes, repair welds can be made without difficulty, but service requirements will demand that the parts

Nine successive teeth broke off this cast steel bull gear for a punch press. A simple fixture and dowel pins allowed welders to repair it without damaging the involute profile below the pitch line

be stress relieved after welding and perhaps reheated. If so, get metallurgical advice and adhere strictly to the specified procedure.

2. Process—Determine the welding process best suited for the repair. Choose the method that will provide best results. Often, dimensional stability will help decide whether to use electric arc, oxyacetylene or gas shielded arc.

Each repair will have certain characteristics that lend themselves better to a given process. The experienced supervisor or welder can recognize these.

3. Electrodes — Select proper electrodes and other materials to do a quality job. Sources of information include electrode and equipment brochures and welding handbooks. (See STEEL's Welding Electrodes Selector opposite page 98.)

4. Preparation — Prepare the weld joint properly to insure good clean base metal. Provide the necessary tools and instruments to do the job—including portable grinders, chipping hammers, chisels, contact pyrometers and strain gages.

5. Operator—Select an experienced operator and instruct him on the procedure and handling of the repair.

Repair Job—At the Cleveland Ordnance Plant, one of the processing operations on torsion bars for M-42 light tanks is stress relieving in a continuous furnace.

Its main gear drive failed (due to a frozen bearing) and cracked the upper housing above the main bearing bore. It was practically impossible to replace the housing, so it was decided that the cast iron part should be gas welded with brazing rod.

Preparation—A ¼-in. hole was drilled at the end of the crack to prevent further cracking during joint preparation and welding. The crack was ground out to develop a 60-degree top bevel with about a 1/16-in. nose.

Because bearing bore and alignment were important, the upper case was doweled in alignment with the lower case and bolted to it. The frozen bearing was reinstalled in the main bore to further insure alignment and to prevent collapse of the inside bore. This also avoided a costly machine setup to true up the bearing bore after welding.

Method — Oxyacetylene torches were used for preheating, and conventional brazing techniques completed the repair. The gear case was placed in a lime box and allowed to cool for 24 hours. Then the case was cleaned, reassembled with new bearings and the old gear and shaft and put back into production.

The maintenance welders spent 20 man-hours on the repair. Down time was two days. Mr. Richilano estimates that the plant saved 50 per cent of the cost of a replacement gear case. Delivery on the part takes six to eight weeks—if it is available.

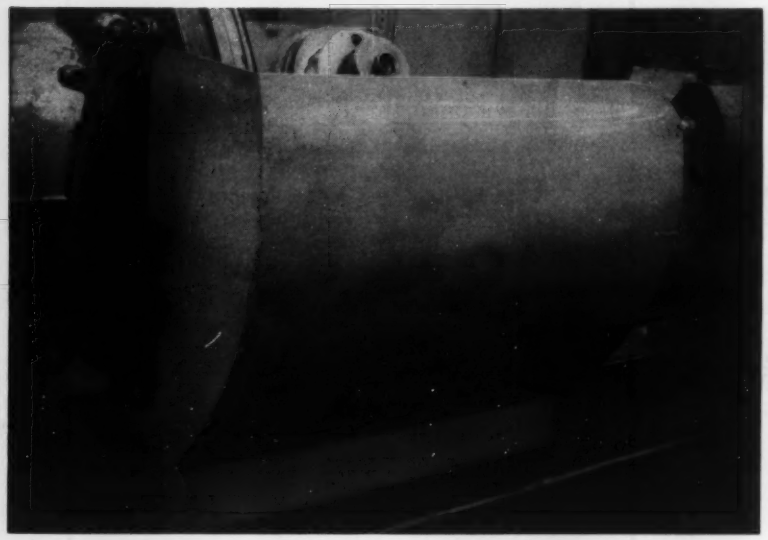
Outside — Maintenance outside the plant involves mobile and portable equipment. Repairs often must be done immediately. It takes little time to weld broken brackets on bulldozers, angle iron supports on snowplows or new teeth on a ditch digger.

Such repairs again require proper joint preparation and correct electrodes. After the joint is welded, sometimes an additional bracing member or reinforcement is advisable to strengthen the area against future failure under similar or more severe operating conditions. Electric arcwelding will handle most of the repairs, although gas welding is better when certain shock loads require a more ductile weld and a broader heat affected zone.

New Items—One item that keeps the Cleveland Ordnance Plant's weld shop busy is guards for rotating machinery. Usually they are made from hot-rolled mild sheet steel which is cut, shaped, fitted and welded.

Among the periodic replacement items fabricated by welding are immersion type processing tanks for phosphating, copper plating, chrome plating and other chemical treatments. The tanks are mild steel, usually ¼-in. thick.

Expansion and contraction of the tanks during heating and cooling cause cracks and corrosion. On-the-spot welding is the most



Maintenance welders at the Cadillac plant in Cleveland make all the guards for rotating machinery. This one is on a Gisholt turret lathe

practical method of repair.

Improvements — Equipment improvements often will require some welding. The Cleveland plant has two boilers servicing the cafeteria and an adjacent manufacturing area. A cutback in production employees greatly reduced steam requirements, and a maintenance supervisor came up with the idea of tying the two together so either or both could be used.

This flexible setup was made possible, quickly, by welding the condensate piping and by-pass piping on the job.

Roof Ventilators—Most plants have some kind of roof ventilation. There comes a time when replacement is necessary because of rust or damage by storms.

The heavier gage units can be formed and fabricated by arcwelding. The lighter gage vents can be made by resistance welding. Rain caps, supporting straps and guy wire clips can be spotwelded to the main body of the vent.

Piping—Maintenance of underground water piping creates some tough problems. Areas that have been attacked by electrochemical corrosion and caused a leak can be repaired by welding.

After excavating, the repair can be made by thoroughly cleaning the area and arcwelding an external metal patch to the pipe. Be sure the patch is large enough so you can weld to sound metal. If patching is not practical or feasible, the piping can be removed and a new piece welded in.

Special Uses — The relatively new inert gas, shielded arcwelding is a boon to the maintenance man. He can make repairs on a wide variety of metals formerly considered nonweldable. The welds are as homogeneous to base metal properties as those obtained with mild steel.

It is possible to deposit a pool of metal (from the filler rod) that is completely protected from atmospheric contamination. This produces a deposited metal often more ductile and stronger than that put down with other arcwelding methods.

Applications — Small portable tools with aluminum housings can be welded easily by this method. Chemical processing tanks fabricated from corrosion resistant steels are inert arcwelded. Crusher rollers, earth moving and digging wear edges and work journal surfaces can be hard surfaced with inert arc.

Magnesium welds soundly by this method and stands up in service. If a lightweight strong frame is needed, no better results can be obtained than by using extruded magnesium shapes or parts formed from sheet stock and welding them into the prescribed design.

Another wide use of inert arc is repair welding of cast iron. The repair often must be made with nickel or Monel filler rod to satisfy service conditions. Joint preparation is generally simple, and preheat with slow cooling after welding is successful.

Equipment—One of the handiest pieces of equipment for sheet metal and light welding, maintains Mr. Richilano, is a resistance or spot-welder. A good compromise size is a 50 or 75 kva machine. It should be an air-actuated unit with foot control, so the operator has his hands free to manipulate the work. An approved magnetic contactor and electronic weld timer are essential for quality work.

Sheet metal welding also can be done by electric arc and oxyacetylene equipment. The average maintenance welder prefers a direct current machine of about 200 amperes capacity for arcwelding. Basic requirements for oxyacetylene welding are good control regulators and torches with a full range of welding tips.

General Purpose — Alternating or direct current machines can be used for general purpose welding. A good machine may be about 400 amperes. A welding positioner can save time and effort in the weld shop in doing a repair or fabricating a new item.

Little outside work can be done without a gasoline-driven portable welder. These versatile machines are as easy to operate as shop mounted units.

Extra Copies Available

You don't have to remove the Welding Electrode Selector. A free copy is available. Write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, O. For quantities, the price is 10 cents per copy.

MILD STEEL

LOW ALLOY STEEL

ALUMINUM

MAGNESIUM

COPPER

STAINLESS STEEL

INCLUDING

AUTOMATIC WIRE

Welding Electrode Selector

Here is practical information to help you find the electrode you want for the job.

COMPOSITION OF DEPOSITED WELD METAL

Tentative designations of the American Welding Society.

Electrode Classification	C	Mo	Cr	Mn	Si	S	Ni
CARBON-MOLYBDENUM ELECTRODES							
E7010-A1, E7011A1, E7020-A1	0.10	0.40-0.65	.....	0.35-0.60	0.40	0.04	.....
E7015-A1, E7016-A1, E7018-A1	0.10	0.40-0.65	.....	0.45-0.90	0.60*	0.04	.....
CHROMIUM-MOLYBDENUM ELECTRODES							
E8010-B1, E8011-B1, E8013-B1	0.10	0.40-0.65	0.40-0.65	0.35-0.60	0.40	0.04	.....
E8015-B1, E8016-B1, E8018-B1	0.10	0.40-0.65	0.40-0.65	0.45-0.90	0.60*	0.04	.....
EXX10-B2, EXX11-B2, EXX13-B2	0.10	0.40-0.65	1.00-1.50	0.35-0.60	0.40	0.04	.....
EXX15-B2, EXX16-B2, EXX18-B2	0.10	0.40-0.65	1.00-1.50	0.45-0.90	0.60*	0.04	.....
EXX10-B3, EXX11-B3, EXX13-B3	0.12	0.90-1.20	2.00-2.50	0.35-0.60	0.60	0.04	.....
EXX15-B3, EXX16-B3, EXX18-B3	0.12	0.90-1.20	2.00-2.50	0.45-0.90	0.60*	0.04	.....
EXX15-B4, EXX16-B4, EXX18-B4	0.12	0.40-0.65	1.75-2.25	0.45-0.90	0.60*	0.04	.....
NICKEL ELECTRODES							
EXX15-C1, EXX16-C1, EXX18-C1	0.12	.....	.....	0.90	0.60*	0.04	2.00-2.75
EXX15-C2, EXX16-C2, EXX18-C2	0.10	.....	.....	0.90	0.60*	0.04	3.00-3.75
MANGANESE-MOLYBDENUM ELECTRODES							
E9015-D1, E9016-D1, E9018-D1	0.90-0.12	0.25-0.45	.....	1.25-1.75	0.60*	0.04	.....
E10015-D2, E10016-D2, E10018-D2	0.15	0.25-0.45	.....	1.65-2.00	0.60*	0.04	.....
ALL OTHER LOW ALLOY ELECTRODES							
GXX10, 11, 13, 15, 16, 18, G7020	.....	0.20	0.30	1.0	0.8	.....	0.5 & V-1.0

Note: Any one of the above elements present in amounts above the specified minimum is considered proof of deliberate alloy addition to produce a low-alloy electrode under this specification.

*Silicon may be 1.00 max if carbon is restricted to 0.06 max.

Source: Lincoln Electric Co., Cleveland. A. O. Smith Corp., Milwaukee.

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STAINLESS STEEL

ASTM-AWS Specification	Air Reduction Sales Co.	Alloy Rods Co.	All-State Welding Alloys Co.	Arcos Corp.	Crucible Steel Co. of America	Champion Rivet Co.	Drawalloy Corp.	General Electric Co.	Harnischfeger Corp.
Tradename→	AIRCO	ARCOLOY‡			REZISTAL				HARSTAIN
E-307-15	.....	.....	.....	.....	.....	307-B	.....	EST-307*	AW3C-L
E-307-16	19-9 Mn	.....	.....	.....	.....	307 Mn-2	.....	.....	AW3C-T
E-308 ELC	19-9 ELC	308 ELC	.....	Chromend KLC (15) Stainlend KLC (16)	308 L	308 CF-2	308 ELC	W-2308 LC EST-308L*	18-8 ELC A18-8 EL
E-308-15	19-9	308 Lime	.....	Chromend K Aerocor 308 Fabricor 308	308 Lime	308-1	308	W-1308 EST-308*	18-8
E-308-16	19-9	308 ac-dc	188	Stainlend K	308 ac-dc	308-2	.....	W-2308	A18-8
E-309 Cb	25-12 Cb	309 Cb	.....	Chromend 25-12Cb(15) Stainlend 25-12Cb(16)	.....	.....	.....	W-2309 Cb	.....
E-309 Mo	.....	309 Mo	.....	.....	.....	.....	.....	.....	.....
E-309-15	25-12	309 Lime	.....	Chromend HC Aerocor 309 Fabricor 309	309 Lime	309-1	309	EST-309* W-1309	25-12
E-309-16	25-12	309 ac-dc	.....	Stainlend HC	309 ac-dc	309-2	.....	W-2309	A25-12
E-310 Cb	25-20 Cb	310 Cb	.....	Chromend 25-20Cb(15)	.....	310 Cb	.....	W-1310 Cb W-2310 Cb	.....
E-310-15	25-20	310 Lime	.....	Chromend HCN Aerocor 310 Fabricor 310	310 Lime	310-1	310	W-1310 EST-310*	25-20
E-310-16	25-20	310 ac-dc	252	Stainlend HCN	310 ac-dc	310-2	.....	W-2310	A25-20
E-310 Mo	25-20 Mo	310 Mo	.....	Chromend 25-20Mo(15)	.....	.....	.....	W-2310 Mo	.....
E-310 Mo Cu	.....	.....	.....	.....	.....	.....	.....	.....	.....
E-312	29-9	312	.....	Chromend 29-9(15)	.....	312-1	312	W-1312 W-2312 EST-312*	.....
E-312 Mo	.....	.....	.....	.....	.....	.....	.....	.....	.....
E-316 ELC	18-12 Mo ELC	316 ELC	.....	Chromend KMoLC(15) Stainlend KMoLC(16)	316 L	316 CF-2	316 ELC	W-2316 LC EST-316L*	18-8, 2 Mo A18-8, 2 M ELC
E-316-15	18-12 Mo	316 Lime	.....	Chromend K Mo Aerocor 316 Fabricor 316	316 Lime	316-1	316	W-1316 EST-316*	18-8, 2 Mo
E-316-16	18-12 Mo	316 ac-dc	.....	Stainlend K Mo	316 ac-dc	316-2	.....	W-2316	A18-8, 2 M 18-8, 3 Mo
E-317-15	.....	317 Lime	.....	Chromend 18-8 Mo	317 Lime	317-1	.....	W-1317	
E-317-16	18-12 3.5 Mo	317 ac-dc	.....	Stainlend 18-8 Mo	317 ac-dc	317-2	.....	W-2317	.....
E-318-15	.....	318	.....	Chromend KMoCb	.....	318-1	.....	.....	.....
E-321-15	.....	.....	.....	.....	.....	.....	.....	EST-321*	.....
E-330-15	15 Cr, 35 Ni	330 Lime	.....	Chromend 15-35	330 Lime	330-1	.....	W-1330 EST-330*	.....
E-330-16	15 Cr, 35 Ni	330 ac-dc	.....	.....	330 ac-dc	330-2	.....	W-2330	.....
E-347-15	19-9 Cb	347 Lime	.....	Chromend 19-9 Cb Aerocor 347 Fabricor 347	347 Lime	347-1	347	W-1347 EST-347*	18-8, Cb
E-347-16	19-9 Cb	347 ac-dc	.....	Stainlend 19-9 Cb	347 ac-dc	347-2	.....	W-2347	A18-8 Cb
E-348	.....	.....	.....	.....	.....	.....	348	EST-348*	.....
E-349	.....	.....	.....	.....	.....	.....	349	.....	.....
E-360	.....	.....	.....	.....	.....	.....	.....	.....	.....
E-380	.....	.....	.....	.....	.....	.....	.....	.....	.....
E-410-15	12 Cr	410 Lime	.....	Chromend 12 Aerocor 410	410 Lime	410-1	410	W-1410 EST-410*	.....
E-410-16	.....	410 ac-dc	.....	Stainlend 12	410 ac-dc	410-2	.....	.....	.....
E-430-15	16 Cr	430 Lime	.....	Chromend 16	430 Lime	430-1	430	W-1430 EST-430*	.....
E-430-16	.....	430 ac-dc	.....	Stainlend 16	430 ac-dc	430-2	.....	.....	.....
E-443	.....	.....	.....	.....	.....	.....	.....	.....	.....
E-446	.....	.....	.....	.....	.....	.....	.....	EST-446*	.....
E-502-15	4-6 Cr Mo	502 Lime	.....	Chromend 5M	502 Lime	Croloy 5A	502	W-1502 EST-502*	.....
E-502-16	.....	502 ac-dc	.....	Chromend 5MA	502 ac-dc	502-2	.....	.....	Harchrom
Others	.....	.....	.....	.....	.....	.....	.....	EST-420*	.....

*Automatic wire also. ‡In Canada, distributed by Canadian Liquid Air Co. Ltd.

h- orp.	Hobart Bros. Co.	Lincoln Electric Co.	Marquette Mfg. Co.	Maurath Inc.	McKay Co.	Metal & Thermit Corp.	National Cylinder Gas Co.	Reid- Avery Co.	A. O. Smith Corp.	Westinghouse Electric Corp.
AIN		STAINWELD		MAURATH	McKAY	MUREX	SUREWELD	RACOLLOY		
-L	.....	.....	.....	.....	.....	.....	.....	307 Lime	SW 307	.....
-T	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
LC ELC	.....	.....	.....	304* 308*	18-8 ELC*	.....	311*	308 ELC	SW 308 ELC	.....
	308	A-5	.....	308 Lime	18-8*	308 Lime	308-15 301*	18-8	SW 308	308-15
	308 ac	A-7	308	308 ac-dc	18-8	308 ac-dc	308-16	18-8 ac-dc	SW 308	308-16
..	.....	.....	.....	309 Cb	25-12 Cb	.....	.....	.....	SW 309 Cb	.....
..	.....	.....	.....	309 Mo	25-12 Mo	.....	.....	.....	.....	.....
	309	B-Cb	.....	309* 309 Lime	25-12	309 Lime	321* 309-15	25-12	SW 309	309-15
	309 ac	.....	309	309 ac-dc	25-12	309 ac-dc	309-16	25-12 ac-dc	.....	309-16
..	.....	.....	.....	310 Mo	25-20 Cb	.....	.....	.....	SW 310 Cb	.....
	310	D	.....	310* 310 Lime	25-20	310 Lime	341* 310-15	2520	SW 310	310-15
0	310 ac	.....	310	310 ac-dc	25-20	310 ac-dc	310-16	2520	SW 310	310-16
..	.....	.....	.....	310 Cb 310 Mo	25-20 Mo	.....	310 Mo-15 310 Mo-16	.....	SW 310 Mo	.....
..	.....	.....	.....	310 Cb	.....	.....	.....	.....	.....	.....
..	.....	.....	.....	.....	29-9*	.....	312-15 312-16	.....	.....	.....
..	.....	.....	.....	.....	29-9 Mo	.....	.....	.....	.....	.....
Mo ELC 2 Mo 3	.....	.....	.....	.....	18-8 Mo ELC*	.....	316 ELC-16	316 ELC	SW 260 316 ELC	.....
2 Mo	316	.....	.....	316* 316 Lime	18-8 Mo*	316 Lime	316-15	18-12	SW 316	316-15
2 Mo 3 Mo	316 ac	.....	316	316 ac-dc	18-8 Mo	316 ac-dc	316-16	18-12	.....	316-16
	.....	.....	.....	317* 317 Lime	18-8 (317)	317 Lime	317-15	18-12	SW 317	317-15
..	.....	.....	317	317 ac-dc	18-8 (317)	317 ac-dc	317-16	18-12 ac-dc	.....	317-16
..	.....	C-Cb	.....	.....	18-8 Mo Cb (318)	.....	.....	.....	.....	.....
..	.....	.....	.....	.....	321*	.....	.....	.....	.....	.....
..	.....	.....	.....	330* 330 Lime	15-35	330 Lime	330-15	15-35	.....	330-15
..	.....	.....	330	330 ac-dc	15-35	330 ac-dc	330-16	15-35	.....	.....
Cb	347	A5-Cb	.....	347* 347 Lime	18-8 Cb*	347 Lime	351* 347-15	18-8 Cb	SW 347 Cb	347-15
Cb	347 ac	A7-Cb	347	347 ac-dc	18-8 Cb*	347 ac-dc	347-16	18-8 Cb ac-dc	SW 347 Cb	347-16
..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
..	.....	.....	.....	.....	15-60*	.....	.....	.....	.....	.....
..	.....	.....	.....	.....	20-80*	.....	.....	.....	.....	.....
..	.....	.....	.....	410* 410 Lime	12 Cr*	410 Lime	410-15	12 Cr-Mo	SW 410	410-15
..	.....	.....	410	410 ac-dc	12 Cr*	410 ac-dc	410-16	12 Cr-Mo	.....	410-16
..	.....	.....	.....	430* 430 Lime	16 Cr*	430 Lime	430-15	16 Cr	.....	430-15
..	.....	.....	430	430 ac-dc	16 Cr*	430 ac-dc	430-16	16 Cr, ac-dc	.....	430-16
..	.....	.....	.....	443*, Lime ac-dc	.....	.....	.....	.....	.....	.....
..	.....	.....	.....	.....	446*	.....	.....	.....	.....	.....
..	.....	.....	.....	502* 502 Lime	5 Cr Mo*	502 Lime Croloy 5A	502-15	5 Cr-Mo	SW 502	502-15
rome 5	.....	.....	.....	502 ac-dc	5 Cr Mo*	502 ac-dc	502-16	5 Cr-Mo, ac-dc	.....	502-16
..	.....	.....	.....	Bare 36 in. lengths	19-9 W Mo* 9 Cr-Mo	.....	.....	.....	.....	.....

LOW ALLOY STEEL

ASTM-AWS Specification	Air Reduction Sales Co.	Alloy-Rods Co.	All-State Welding Alloys Co.	Arcos Corp.	Canadian Liquid Air Co.	Champion Rivet Co.	General Electric Co.	Harnischfeger Corp.
Trodename→	AIRCO	ATOM ARC					STRIKEASY	
E-7010	93	.....	.....	.....	LA 7010	Blue Devil 85	W-710A	CM-50
E-7011	382	.....	.....	.....	.....	.....	W-711A	CM-50-1
E-7013	.....	.....	.....	.....	.....	.....	.....	.....
E-7015	.....	.....	.....	.....	.....	Croloy 1A	.....	.....
E-7015-B2	.....	.....	.....	.....	.....	7015 B2	.....	.....
E-7016	327 Easyare 328† Easyarc LH 716†	7016†	616	Tensilend 70	LA 7016IP† LA 7016P† AtomArc 7016†	Hy-Lo	W-716B	70-LA-2 70-LB P&H .25C
E-7016 A1	.....	7016 Mo†	.....	.....	AtomArc 7016 Mo†	.....	.....	DH-170† 170-LA†
E-7018 Proposed	.....	.....	.....	Ductilend 70†	.....	Speedemon 716 †	718†	.....
E-7020	94	.....	.....	.....	.....	Black Devil 75	W-720A	CM-50-2
E-7028 Proposed	.....	.....	.....	.....	.....	.....	728†	.....
E-8011	.....	.....	.....	.....	.....	.....	W-811A	.....
E-8016	396, 395	.....	.....	Tensilend 80	.....	.....	W-816A, B	P&H 8
E-8016-B2	.....	8016 CM†	.....	Chromend 1M	AA 8016 CM†	.....	.....	80 LE, 180 LE†
E-8016-C1	.....	.....	.....	Nickend 2	.....	.....	W-816A	75 LP
E-8016-C2	.....	8016N†	.....	Nickend 3	AA 8016 N†	.....	.....	.....
E-9010	.....	.....	.....	.....	.....	.....	.....	.....
E-9010-B2	.....	.....	.....	.....	.....	.....	.....	.....
E-9011	.....	.....	.....	.....	.....	.....	.....	.....
E-9015	.....	.....	.....	Chromend 2 M (S) Manganend 1 M	.....	Croloy 2A	.....	.....
E-9015-B3	.....	.....	.....	Chromend 2 M	.....	Croloy 2¼ A	W-1016B	.....
E-9016	354	.....	.....	Ductilend 90†	.....	.....	W-916A	AW 2B, P&H 7, P&H .40C
E-9016-B3	.....	9016 CM†	.....	Chromend 2 MA	AA 9016 CM†	.....	.....	90 LE 190 LE†
E-10013	190	.....	.....	.....	.....	.....	W-1013A	AW-4
E-10015	.....	.....	.....	Manganend 2 M	.....	Hy-Lo 230-D	.....	.....
E-10016	394, 353 351	10016 MM†	.....	Tensilend 100	AA 10016 MM†	.....	W-1016 A, B, C, D	P&H 12-2 90 LH-2
E-11015	.....	.....	.....	.....	.....	.....	.....	.....
E-11016	.....	AtomArc T†	.....	Ductilend 110	AtomArc T†	.....	.....	.....
E-12015	352	.....	.....	Tensilend 120	.....	.....	W-1215A	P&H 17-1
E-12016	.....	12016 NMV†	.....	.....	AA 12016 NMV†	.....	.....	.....
E-12020 (Special)	.....	.....	.....	.....	.....	.....	.....	.....

MILD STEEL

E-4510	41, 63	.....	.....	.....	SC 15	Salcoat	F, L	Washcote
E-4520	.....	.....	.....	.....	.....	Speed 44	.....	.....
E-6010	78E Easyarc 10†	.....	.....	.....	LA 6010	Blue Devil	W610A, B Strikeasy 610†	AP, APV
E-6011	230	.....	.....	.....	LA 6011	Bluedac	W-611A	AC-1
E-6012	323, 387	.....	.....	.....	LA 6012	Gray Devil Gray Devil 2	W-612A,B,D, E,G,J,K	PF, PFA
E-6013	90, 90A, 90B Easyarc 14†	.....	.....	.....	LA 6013	Graydac, Tan Devil	W-613A,B,C	AC-3, SM
E-6014 Proposed	.....	.....	.....	.....	.....	Speedemon 14†	Strikeasy 614†	DH-6†
E-6015	.....	.....	.....	.....	.....	.....	.....	.....
E-6016	312	7016†	.....	.....	AA 7016† LA 7016 P† LA 7016 IP†	Hy-Lo	W-616A	70 LA-1 170 LA†
E-6018 Proposed	.....	.....	.....	.....	.....	.....	.....	.....
E-6020	315, 306, 81	.....	.....	.....	LA 6020	Black Devil	W-620, A,B, C,D	DH-2, DH-3
E-6024	Easyarc 12†	.....		.....	LA 6024	Speedemon 24†	Strikeasy 624†	DH-5†
E-6027	.....	.....	.....	.....	.....	.....	.....	.....
E-6030	.....	.....	.....	.....	.....	Red Devil	.....	.....
Others	.....	.....	.....	.....	.....	.....	.....	.....

†Iron powder

Hobart Bros. Co.	Lincoln Electric Co.	Marquette Mfg. Co.	McKay Co.	Metal & Thermit Corp.	National Cylinder Gas Co.	Reid-Avery Co.	A. O. Smith Corp.	Westinghouse Elec. Corp.
		MARQUETTE	PLURALLOY	MUREX	SUREWELD	RACO		
885	Shield-Arc 85, 85P	.....	.....	Murex Molex	MLY-50	74	SW 75, 80	XL-710
.....	.....	.....	.....	MA	MLY-C	7011	.....	ACP-711
.....	.....	.....	.....	.....	.....	.....	SW 85	.....
.....	.....	.....	.....	Croloy 1A	.....	180-15	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....
16	.....	7016	70 AC 7161P†	HTS 180	7016	180-16	SW 84 SW 47†	LOH-716
Rocket 716†	.....	.....	.....	HTS 80, Speedex HTS†	7018†	.....	.....	.....
.....	.....	.....	.....	.....	.....	718	.....	.....
.....	Jetweld 2HT†	.....	.....	DM Speedex LH†	MLY-A	64	SW 76	DH-720
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	85	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	8016Q	.....	8016	SW 79, 81	.....
Rocket LH 8160†	.....	.....	.....	.....	.....	8016 B2	.....	.....
.....	.....	.....	.....	.....	.....	8016 C1	.....	.....
Rocket LH 816†	.....	.....	.....	.....	.....	8016 C2	.....	.....
.....	.....	.....	.....	.....	.....	.....	SW 95	.....
.....	Shield-Arc 90 CM	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	2111	.....	.....	.....	.....
.....	.....	.....	.....	Croloy 2A, 2¼A	.....	9015	.....	.....
Rocket 916†	.....	.....	.....	.....	.....	9015 B3	.....	.....
.....	.....	.....	.....	2116	9016	9016	SW 89, 90	.....
Rocket 916 LH†	.....	.....	.....	.....	.....	9016 B3	.....	.....
.....	Planeweld 1	110	.....	.....	.....	10013	SW 88	.....
.....	.....	.....	.....	.....	.....	230-15	.....	.....
Rocket 1016 LH†	.....	.....	100 AC	4216, AWL HTS 230	.....	230-16 $MnMo_3$	SW 100	.....
.....	.....	.....	.....	.....	.....	.....	SW 91	.....
.....	.....	.....	.....	.....	.....	116T, 118T†	.....	.....
.....	.....	.....	.....	HTS 260	.....	260-15	SW 120	.....
Rocket LH 1216†	.....	.....	120 AC	.....	.....	T-1	.....	.....
.....	.....	.....	.....	.....	.....	.....	SW 101	.....
Sulkote	Stable-Arc	101	21	.....	30-S	Blue Label	.....	Sulcoat 18
.....	.....	.....	3	.....	30XL, 30X†	Type D	.....	.....
10	Fleetweld 5, 5P Lightweld	105	15	Type R Speedex R†	B & SP	7	SW 10	XL-610 XL-610A
335	Fleetweld 180†, 35	130 Red-Rod	11	Type A	CB	11	SW 14	ACP-611
12, 212	Fleetweld 7, 72	120	17, 116	N-13, Genex Genex-M	N, NM, G	8	SW 11, 12, 17, 29	FP-612, FP-2-612
447, 313, 413, 13	Improved FW 47† Fleetweld 37 Planeweld 2	140, 151, 6013	24	Alternex Type U, U-13	C, CE, CN	13	SW 15, 16 SW 15-IP†	SW-613 SW-2-613 SW-3-613
Rocket 14†	Improved FW-47	.....	.....	Speedex U†	14	614	.....	Zip-14
.....	.....	.....	.....	.....	.....	6015	.....	.....
16	Jetweld LH 70† Shield Arc LH70	.....	Pluralloy 70-AC 716 IP†	HTS	.....	6016	SW 65	LOH-616
.....	Jetweld LH 70	.....	.....	.....	.....	.....	.....	.....
111	.....	115	16	FHP, D	FD	20	SW 35	DH-620
Rocket 24†	Jetweld 1†	12	Comet-Arc	Speedex†	24	624	SW 44†	Zip-24†
Rocket 27†	Jetweld 2†	.....	.....	.....	27	627	.....	Zip-27†
.....	.....	.....	18	.....	.....	5	.....	.....
.....	.....	.....	.....	.....	.....	.....	SW 18, 19	.....

AUTOMATIC WELDING WIRE

Description or Specification	Air Reduction Sales Co.	Canadian Liquid Air Co.	Drawalloy Corp.	General Electric Co.	Lincoln Electric Co.	Linde Air Products Co.	McKay Co.	Metal & Thermit Corp.	National Cylinder Gas Co.	Page Steel & Wire Div. Amer. Chain	Reid-Avery Co.	A. O. Smith Corp.	Stan Steel Wire
Armco	.....	.....	.....	.....	.....	.....	.....	.....	.....	Page Armco	.....	.....	.....
1005—0.06 C max	.....	.....	.....	.....	.....	.....	.....	21	.....	A-S-6	0.06 C	.....	6-15
0.06 C max, 1.4 Mn	.....	.....	.....	.....	.....	65	.....	.....	.....	.....	.....	.....	.....
1008—0.10 C max	.....	.....	.....	EMS-4202	L-60	43	McKay 83	.....	.....	A-S-10	0.08/0.10 C	.....	15-50
0.04 C, 0.14 Mn	.....	.....	.....	.....	.....	.....	82, 80	.....	.....	.....	.....	.....	.....
0.14 C, 2.0 Mn	.....	.....	.....	.....	.....	36	85	22	.....	A-S-15	Hi-Mang.	.....	15-20
0.14 C max, 0.5 Mo	.....	.....	.....	.....	L-70	.....	.....	.....	.....	.....	.....	.....	.....
0.14 C, 1.9 Mn, 0.5 Mo	.....	.....	.....	.....	.....	40 (40A)	86	25	.....	A-S-15-Mo	Hi-Mang. Mo.	.....	15-20
0.15 C, 1.20 Mn, 0.30 Cr	.....	.....	.....	.....	.....	32 CMS	.....	.....	.....	.....	.....	.....	.....
0.20 C, 1.2 Mn	675	Hi-Tensile	.....	EMS-601	.....	29, 35, 66	84	23	101	A-S-20-G or S	Hi-Tensile	CO 85	20-12
Medium Carbon	628	.....	.....	ELA-61B ELA-61C	L-201	296	65	50	.....	A-S-65	Med. Carbon	.....	60-12
High Carbon	.....	.....	.....	.....	.....	.....	95	100	.....	A-S-110	.....	.....	100-6
AISI-4130	.....	.....	.....	.....	.....	4130	.....	.....	.....	A-S-4130	.....	.....	.....
4140	.....	.....	.....	.....	.....	4140	.....	.....	.....	.....	.....	.....	.....
4160	.....	.....	.....	.....	.....	1730	.....	.....	.....	.....	.....	.....	.....
4340	.....	.....	.....	.....	.....	4340	.....	.....	.....	.....	.....	.....	.....
4350	.....	.....	.....	.....	.....	2437	.....	.....	.....	.....	.....	.....	.....
502	.....	.....	.....	.....	.....	2842	.....	.....	.....	.....	.....	.....	.....
521	.....	.....	.....	.....	.....	521	.....	.....	.....	.....	.....	.....	.....
Chrome-Moly	.....	.....	1¼ Cr, ½ Mo 2¼ Cr, 1 Mo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
AISI-8150	.....	.....	.....	.....	.....	1928	87	.....	.....	A-S-8150	RACO-8150	.....	8150
AISI-8620	.....	.....	.....	.....	.....	.....	.....	.....	.....	A-S-8620	.....	.....	.....
SAE-9115	.....	.....	.....	.....	.....	.....	.....	.....	.....	NAX-9115	.....	.....	.....
0.12 C, 1.0 Mn Silicon Killed	.....	.....	.....	.....	L-61	.....	.....	.....	.....	A-S-17	RACO-10/15C	.....	.....
Others:	.....	.....	.....	.....	.....	.....	.....	.....	NCG Dual-shield (CO_2)	.....	.....	CO-86	.....

COPPER

Description or Specification	Air Reduction Sales Co.	Alloy Rods Co.	All-State Welding Alloys Co.	Ampco Metal Inc.	Arcos Corp.	Canadian Liquid Air Co.	Champion Rivet Co.	General Electric Co.	Hobart Bros. Co.	Lincoln Electric Co.	Marquette Mfg. Co.	Metal & Thermit Corp.	National Cylinder Gas Co.
Tradename→	AIRCO		ALL-STATE	AMPCO-TRODE								MUREX	SUREWELD
E-CuSnA	.....	.....	.....	.....	.....	.....	.....	W-70	.....	.....	.....	.....	20, 20B, 22
E-CuSnC	70	Bronze-Arc C	24	Phos-Trode*	.....	Bronze Arc C	Bronze Devil	E Cu 102*	Arcbronze	Aerisweld	.....	Pb-57	.....
E-CuNi	.....	.....	.....	.....	Nicuend	.....	.....	.....	.....	.....	.....	.....	.....
E-CuSi	.....	.....	.....	.....	.....	.....	.....	E Cu 110*	.....	.....	No. 61	.....	.....
E-CuAlA-1	100*	.....	20	.....	.....	.....	.....	E Cu 158*	.....	.....	.....	.....	.....
E-CuAlA-2	.....	.....	.....	10*	.....	.....	.....	E Cu 100*	.....	.....	.....	Ab-12	.....
E-CuAlB	116	.....	.....	160*	.....	.....	.....	.....	.....	.....	.....	Ab-16	.....
E-CuAlC	120	.....	.....	200	.....	.....	.....	.....	.....	.....	.....	Ab-20	.....
E-CuAlD	125	.....	.....	250	.....	.....	.....	.....	.....	.....	.....	Ab-25	.....
E-CuAlE	130	.....	.....	300	.....	.....	.....	.....	.....	.....	.....	Ab-30	.....
E-CuAlNi	.....	.....	.....	40*, 46*	.....	.....	.....	.....	.....	.....	.....	.....	.....
Others	.....	.....	.....	.....	.....	.....	.....	ECu 145*	.....	.....	.....	.....	.....

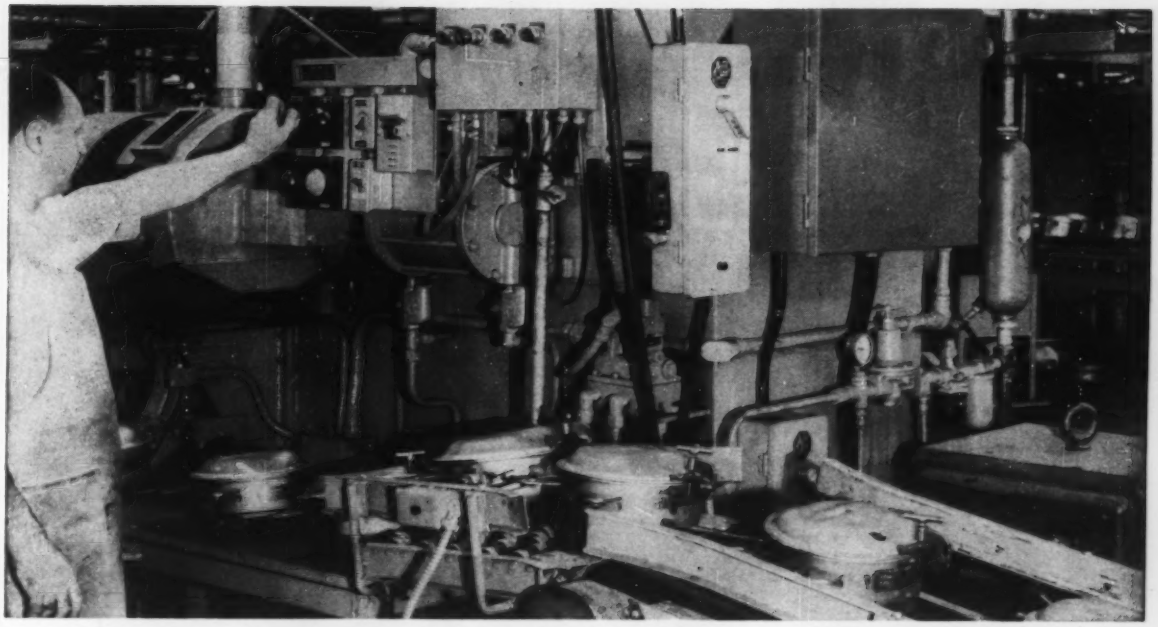
ALUMINUM

Description or Specification	Air Reduction Sales Co.	All-State Welding Alloys Co.	Arcos Corp.	Canadian Liquid Air Co.	Champion Rivet Co.	General Electric Co.	Reid-Avery Co.	Hobart Bros. Co.	Lincoln Electric Co.	Marquette Mfg. Co.	McKay Co.	Metal & Thermit Corp.	National Cylinder Gas Co.
Al-2	.....	1100* 2S (coated)	Alumend 2S	.....	Al-2	EA 1100*	EA 1100*	.....	.....	.....	2S*	Al-2S	201*
Al-43	57	4043* 32 (coated)	Alumend 43S	LA Aluminum	Al-43	EA 4043*	EA 4043*	.....	Aluminum Weld	70	43S*	Al-43	Sureweld 1217-C, 21
Al-54	.....	5154*	.....	.....	.....	EA 5154*	EA 5154*	.....	.....	.....	54S*	.....	231*
Al-56	.....	5356*	.....	.....	.....	EA 5356*	EA 5356*	.....	.....	.....	56S*	.....	221*
Al-57	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Others	.....	618*, 63S, 716, 718, 355, 356	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

MAGNESIUM

J-1	.....	61*	.....	.....	.....	Alloy J Alloy C	.....	.....	.....	.....	.....	.....	401*

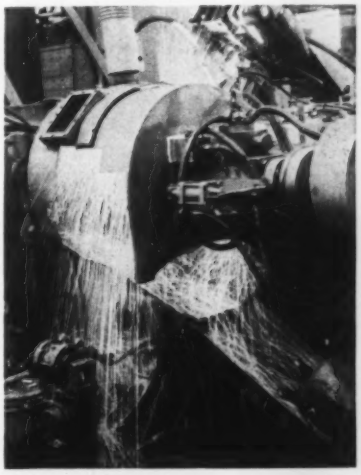
*Automatic Wire also



A belt conveyor brings compressors from the assembly line. Clamp holds the cover of the compressor shell until unit is in welding machine

Kelvinator Turns to CO_2

Welding compressor shells automatically requires an adapter to reduce accumulation of weld spatter. Here's how one firm whipped the problem with a modification of the welder



After the protective hood is in place, workpiece rotates 360 degrees under the welding head. Parts are ejected from rear

IF you need more evidence that Detroit's taking to the gas shielded arc, look at the photograph above: It's new tooling for compressors that will be used in 1957 Kelvinator refrigerators.

Old Way — Compressor shells must be hermetically sealed; welding is widely used for joining. Last year's models were welded with a submerged arc in a carbon flux.

The seal must be made without allowing dust to get inside. The submerged arc tended to spread the joint, making cleanliness difficult.

CO_2 solves the problem.

Spatter — When the equipment was installed, spatter accumulated on the nozzle, remained molten and dropped onto the weld joint just ahead of the arc. Leaks usually developed at that point.

Spatter also solidified on the gas feed and interfered with correct distribution of the shielding gas.

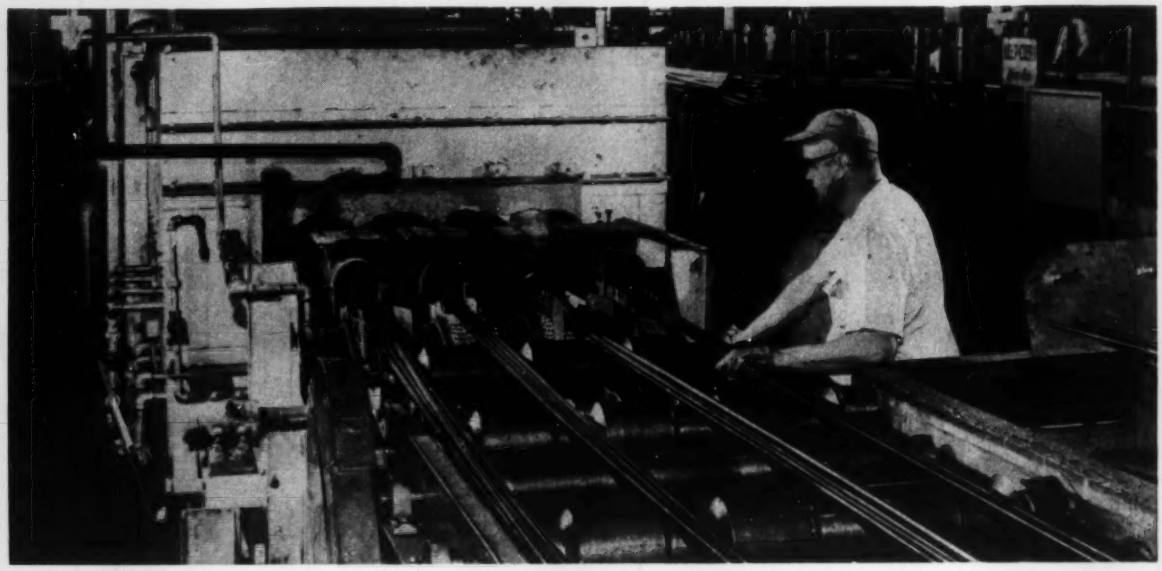
Kelvinator tried to reduce spatter by shortening the arc, but couldn't prevent build-up on the gas shield. It found the answer in a copper tube which runs down the side of the welding head to the welding wire. Carbon dioxide is cut off from the regular shield and fed through the tube. It provides effective shielding and is partially protected from spatter. The high conductivity of the copper reduces adherence of the metal particles.

Automatic — The welder uses Airco heads to produce about 100 compressors an hour. As each one arrives on a belt conveyor, an operator places it on a fork which moves it into position in the machine.

After a protective cover slides over it, the shell and cover are welded together. The work rotates 360 degrees.

After welding, the compressor is ejected and slides down a chute where a workman picks it up and hangs it on a conveyor.

The new design is more than one-third lighter than the old model.



Continuous bright annealing furnace at Steel & Tubes Division of Republic Steel Corp., Cleveland

Speed-Up for Bright Stainless Tubing

Conveyorized muffle-type annealing furnace handles tubing up to 4 in. in diameter on a continuous basis. This means that pickling tanks have less work to do

SOME of the bright stainless tubing going into dairy and food processing equipment has never seen a polishing. It acquires its shiny surface in a new bright annealing furnace at the Steel & Tubes Division plant of Republic Steel Corp. in Cleveland.

Bright annealed welded tubing has been available in some sizes, but Republic's furnace turns the process into a continuous, high volume operation with these advantages:

1. Improved surface finish—no scaling or scratches.
2. Reduced dependence on pickling.
3. Reduced handling.
4. Increased size range.

Muffles—The 78 ft long furnace is divided into a heating zone (the first 25 ft) and a cooling zone. Through the furnace, and extending a few inches from each end, run four parallel alloy steel muffles which are D-shaped. The heating zone is natural gas fired, with flame impinging on the outside of the muffles. Inside the muffles, temperature rises to a maximum of 2100°F.

The muffles are water jacketed in the cooling zone, which is sufficiently long to bring the tubes down to room temperature by the time they emerge from the furnace. The fast temperature drop prevents carbide precipitation.

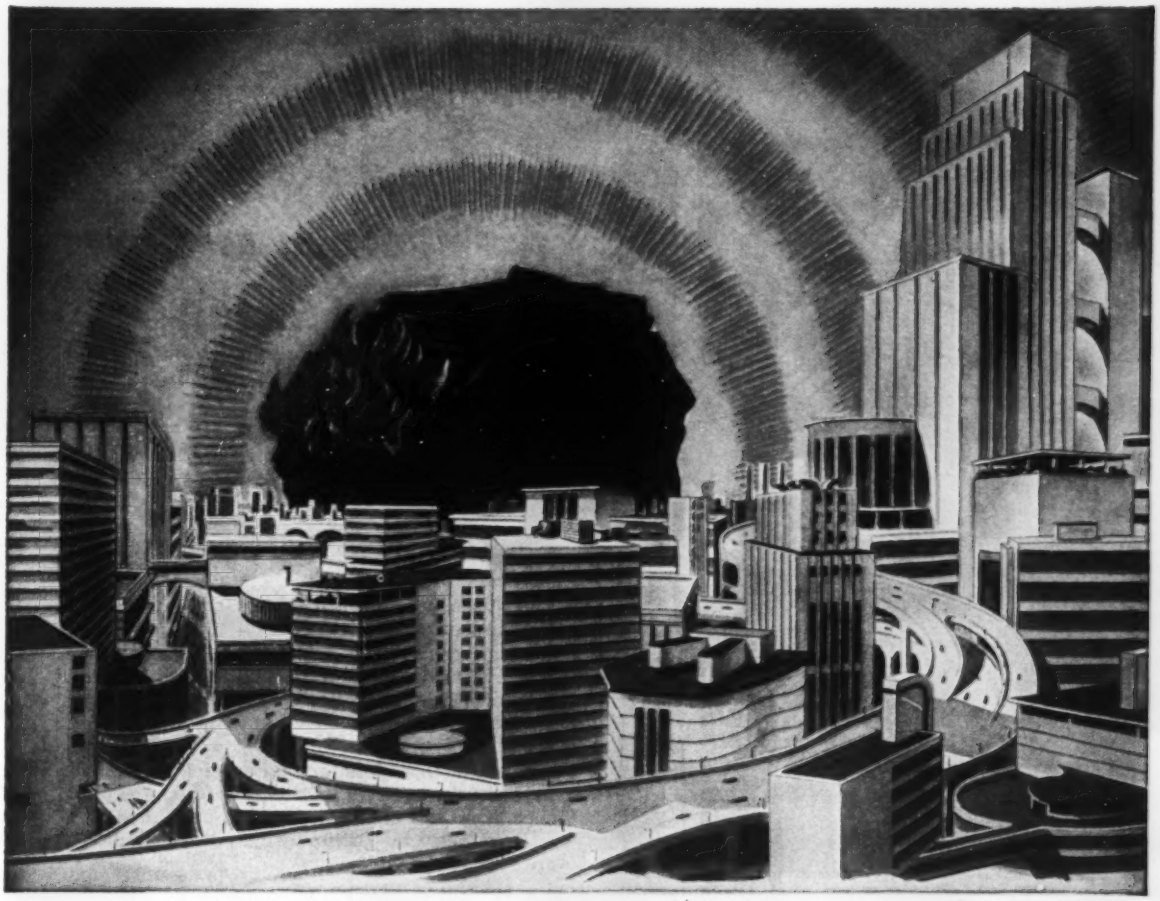
Atmosphere — Dissociated ammonia gas is introduced into the muffles at a pressure slightly over atmospheric. The tubes move up the entry table on powered rollers and ride through the muffles on endless wire mesh belt.

Rated capacity is 1000 lb per hour. Speeds vary from 1 to 6 fpm, depending on the size of the tubing, which can be ¼ to 4 in. OD.

Quality—Chicago Flexible Shaft Co. built the furnace to Republic specifications which envisioned savings to the customer by eliminating the high cost of pickling and polishing. While the furnace does not eliminate the need for pickling, the pickle tank is no longer needed for scale removal. It has been relegated to the role of flash cleaner and passivator.

As it comes from the furnace, the metal has the dense, smooth surface of the cold-rolled material from which the tube was made. The hydrogen-nitrogen atmosphere prevents the formation of scale, which is especially difficult to remove from the inside of long, small diameter tubing by pickling.

Among the first to adopt the bright annealed tubing were makers of stainless processing equipment for fruit juices. Replacement orders indicate acceptance.



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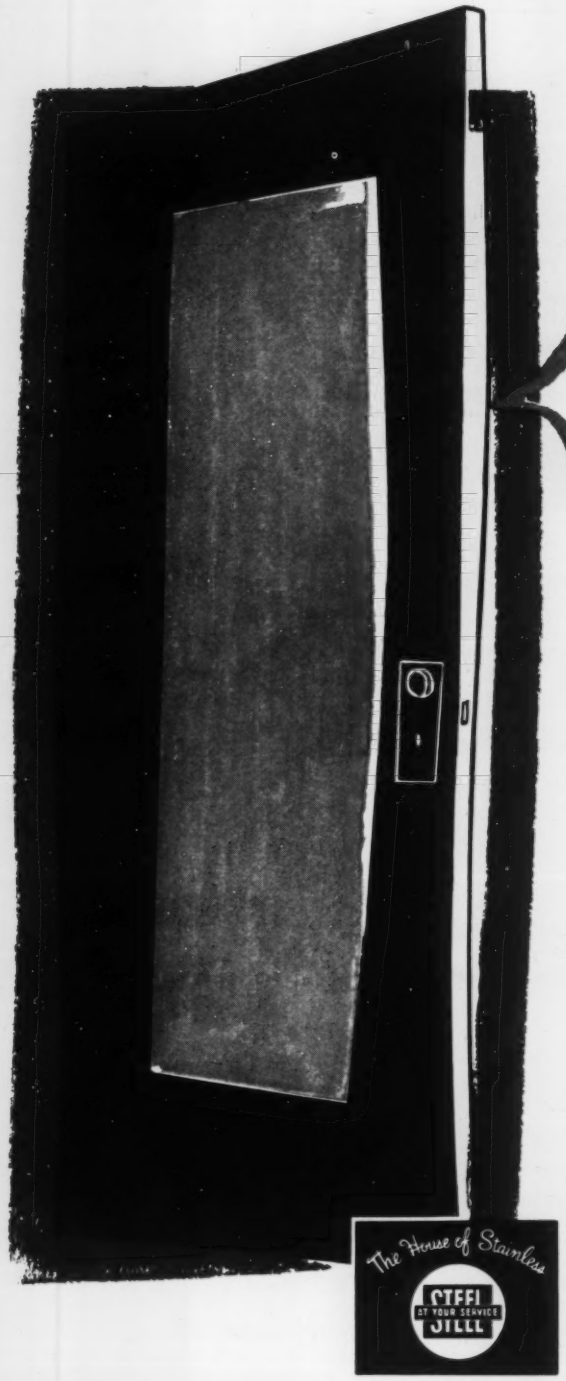

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- **Counsel on set-up and operating procedures.**

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AMERICAN WELDING SOCIETY

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS

5th National Spring Meeting Exposition & Welding Conference

PROGRAM

All Sessions At Sheraton Hotel

Monday, Apr. 8—10 a.m.

Official opening and business session

Address by J. J. Chyle, president, AWS.

Presentation of national awards.

Adams Lecture—**"Evolution of High-Tensile Weld Metal with Low-Hydrogen Electrodes,"** by D. C. Smith, Harnischfeger Corp.

J. J. Chyle, president, AWS

Monday Afternoon

(Three simultaneous sessions)

RADIATION EFFECTS

Effects of Neutron Radiation on the Mechanical Properties of Some Structural Steels—Elmer E. Baldwin, General Electric Co.

Effect of Irradiation on Weldability of ASTM A212, Grade B—Wendell R. Hutchinson, Westinghouse Electric Corp.

Inert-Tungsten-Arc Buttwelding of Zircaloy-2 Tubes—J. W. Lingafelter, General Electric Co.

M. S. Coover, president, AIEE

WELDABILITY and RESEARCH

Atmospheric Water Vapor Effects on D-C Arc Electrode Burnoff Rates—R. H. Benner and T. Benjamin Jones, Johns Hopkins University.

Corrosion Resistance of Type 20 and Type 20 Cb Stainless Steel Welds—Hallock C. Campbell, Thomas J. Moore, Arcos Corp., and S. E. Tyson, Carpenter Steel Co.

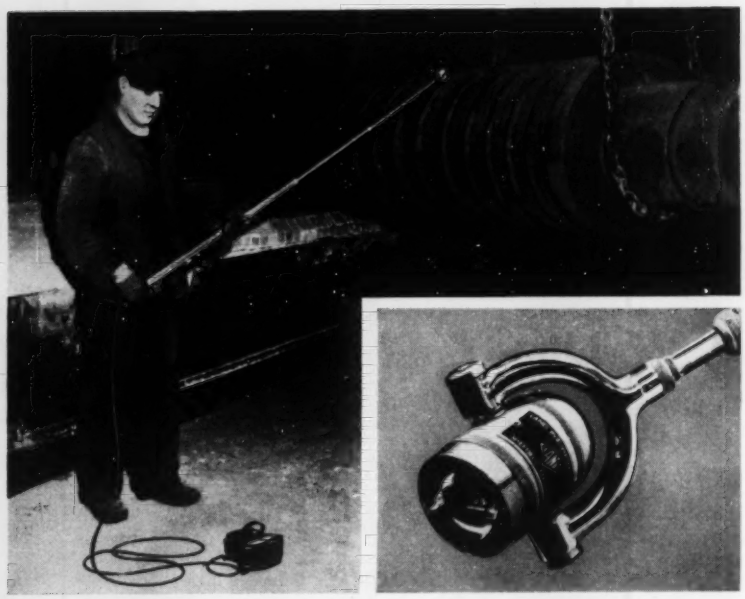
Problems Associated with the Welding of T-1 Steel—Perry C. Arnold, Chicago Bridge & Iron Co.

APPLICATIONS

Welding and Related Procedures Encountered in a Modern Steel Foundry—Samuel W. Gearhart Jr., Birdsboro Steel Foundry & Machine Co.

A New CO_2 Welding Process—A. F. Chouinard, R. P. Monroe, National Cylinder Gas Co.

Now Check Surface Temperatures to ±0.5% in Only 5 Seconds



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AWS PROGRAM . . .

Rockets for Steel Hardening—James A. Browning, Dartmouth College.

Tuesday Morning, Apr. 9

(Three simultaneous sessions)

NUCLEAR REACTORS

Welding Problems in Pressure Vessels for Nuclear Reactors—R. E. Lorentz Jr., Combustion Engineering Inc.

Designing and Fabricating the APDA Reactor Vessel—D. O. Leeser, D. J. Sengstaken, Atomic Power Development Associates Inc., and C. T. Ward, Combustion Engineering Inc.

Peripheral Welding of Internally Clad Steel for Nuclear Reactor Application—W. J. Leonard and J. C. Thompson Jr., Union Carbide Nuclear Co.

RESISTANCE WELDING

Preliminary Investigation of Commercial Spotwelding of 0.051 In. 5052-H32 Aluminum Alloy Sheets—Richard A. Davis and Robert C. McMaster, Ohio State University.

Spotwelding 65-35 Brass on Single-Phase Equipment with Slope Control—Loring E. Mills and Harry C. Wolfe, General Electric Co.

Electrode Tip-Life Studies in Series Spotwelding—E. F. Nippes, W. F. Savage, S. M. Robelotto and K. E. Dorschu, Rensselaer Polytechnic Institute.

RESEARCH and APPLICATION

Stress Corrosion Cracking of Titanium Weldments—W. L. Arter and R. Meredith, North American Aviation Inc.

Bonded Fluxes for Submerged Arc Welding — Hallock C. Campbell, Arcos Corp., and Wallace C. Johnson, welding consultant.

Tungsten Inert-Gas Spotwelding of an Automatic Transmission Subassembly—W. G. Mertens, General Motors Corp.

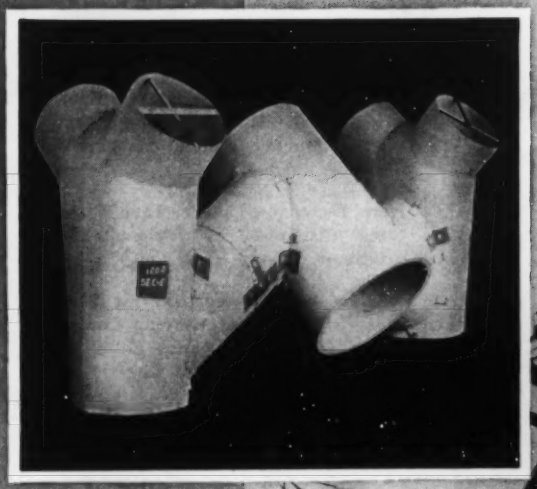
Tuesday Afternoon

(Three simultaneous sessions)

RESISTANCE WELDING

(Session is sponsored by the Committee on Electric Welding, AIEE)

Design of Largest Frequency Con-



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AWS PROGRAM . . .

verter Unipolar Resistance Spot-welder—J. E. Deffenbaugh and F. E. Murray, Federal Machine & Welder Co.

New Techniques in Precision Welding Control—J. L. Solomon, M. Balikov, Sciaky Bros. Inc.

A New Basic Component for Electronic Resistance Welding Control —A High Performance Relay—E. B. McDowell, General Electric Co.

WELDABILITY and RESEARCH

Welding of High-Strength Pressure Vessel Steels in Heavy Sections—A. P. Bunk, Chicago Bridge & Iron Co.

Sulphur and Phosphorus Versus Hot Ductility of Mild-Steel Weld Metals—A. L. Lowe Jr., P. J. Rieppel and R. P. Sopher, Battelle Memorial Institute.

Relative Behavior of Notch-Toughness Tests for Welded Steel—W. J. Murphy, W. D. McMullan and R. D. Stout, Lehigh University.

STRUCTURES

Stress Conditions in Welded Structural Connections Subjected to Impact Loading — Paul J. Brennan and Harry A. B. Wiseman, University of Delaware.

The Plastic Behavior of Structural Members and Frames—George C. Driscoll Jr., Lynn S. Beedle, Lehigh University.

A Short Course in Welded Rigid-Frame Design — Martin P. Korn, consulting engineer.

Wednesday Morning, Apr. 10

(Three simultaneous sessions)

RESISTANCE WELDING

(Session is sponsored by the Committee on Electric Welding, AIEE)

A New Welder Busway Distribution System—R. W. Dailey, Chrysler Corp. and L. E. Fisher, General Electric Co.

Save Air and Improve Gun Welding Performance—J. W. Brown, Square D Co.

The Proximity Limit Switch—A Versatile Tool for Industry—R. C. Mierendorf, Square D Co.

WELDABILITY and RESEARCH

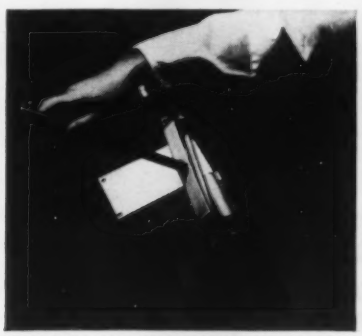
Stress Relieving of Weldments—

Typical of the test equipment in the ACP Quality Control Laboratory is this Bell adhesion tester for determining how firmly the paint finish adheres to ACP Alodized aluminum.

ACP Process Standards ARE MAINTAINED

BY THESE ADHESION AND DUCTILITY TESTS

ANOTHER METHOD of determining paint adhesion is through distortion of the metal with an Olsen Cup Tester. This device indicates the resistance of the Granodine bonded finish to cracking.



ADHESIVE CHARACTERISTICS of ACP Lithoform are tested in this conical mandrel. Even under bending stresses (diameters range from ⅛ to 1½ in.) the paint finish on the Lithorized metal won't peel.

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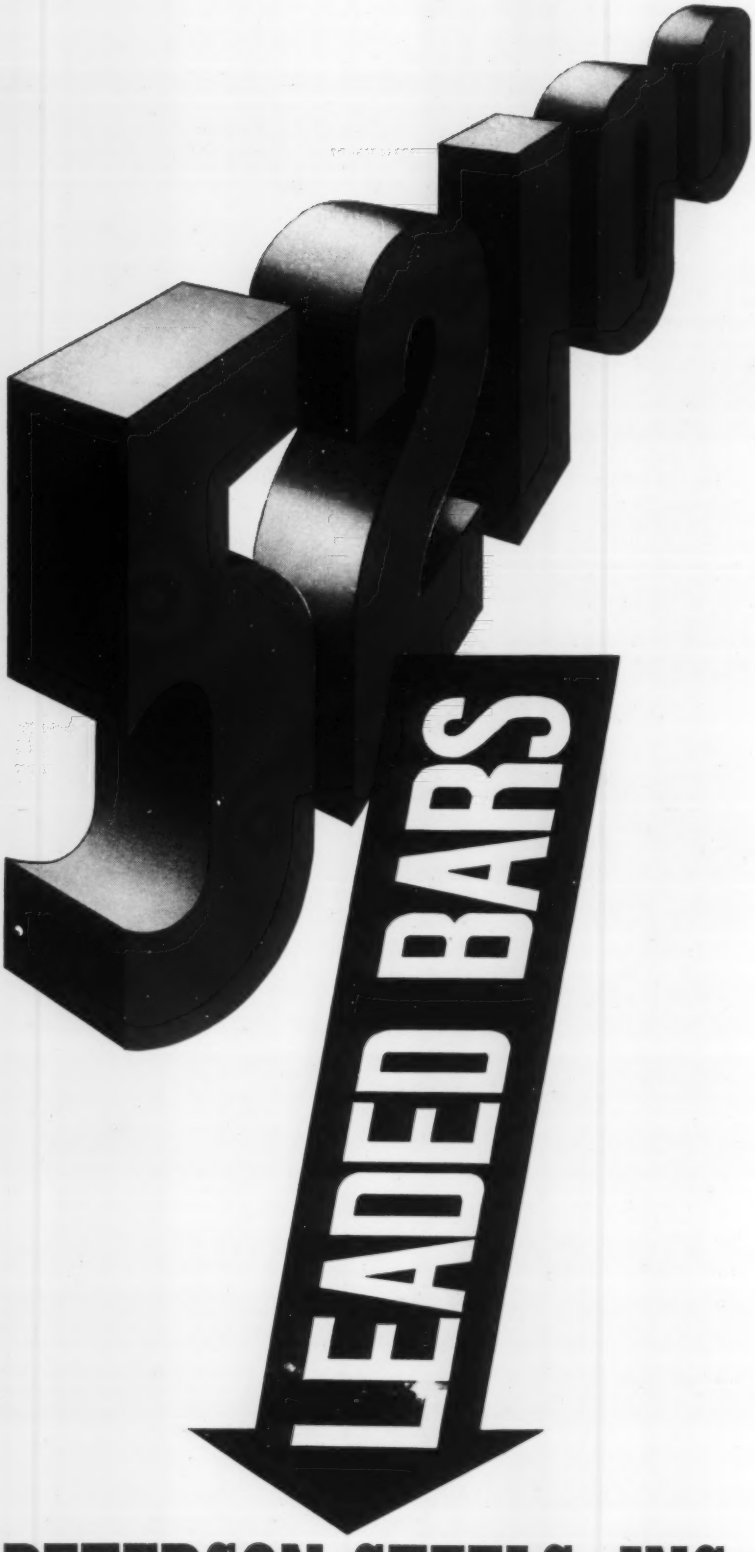

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AWS PROGRAM . . .

Earl R. Parker, University of California.

Arrest of Brittle Fractures in Wide Steel Plates—Robert J. Mosborg, William J. Hall and William H. Munse, University of Illinois.

Design—Its Influence on Residual Stress and Brittle Fracture—Joseph L. Thomas, Pullman Standard Car Mfg. Co.

DESIGN and APPLICATIONS

Joint Design for Making Root-Pass Welds Without Filler Metal—W. R. Smith and L. C. Lemon, General Electric Co.

Welded Design for Improved Vibration Control—Omer Blodgett, Lincoln Electric Co.

Boiler Code Welding and Joint Design with the CO_2 Process—J. D. Carey Jr., General Electric Co.

Thursday Morning, Apr. 11

(Three simultaneous sessions)

ARC WELDING

(Session is sponsored by the Committee on Electric Welding, AIEE)

Electrical Requirements for Automation in Arc Welding—R. W. Tuthill and R. D. Mann, General Electric Co.

Factors That Effect Metal Transfer with Gas-Shielded Arc Welding—A. Lesnewich, Air Reduction Co. Inc.

Experimental Welding with Cone Arc—R. E. Monroe and D. C. Martin, Battelle Memorial Institute.

TITANIUM and ZIRCONIUM

Effects of Interstitials on Weldability of Titanium Alloys—Harry Schwartzbart, John Rudy and J. B. McAndrew, Armour Research Foundation.

Arc Welding of Vacuum and Inert-Atmosphere Melted Zircaloy-2—Howard C. Ludwig, Westinghouse Research Laboratories.

Corrosion Resistance of Zircaloy-2 Brazements in High-Temperature Water—Harry Schwartzbart, J. B. McAndrew and R. Necheles, Armour Research Foundation.

BRAZING

NiCrB Brazing of a High-Temperature Alloy—George Aggen, Edward

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AWS PROGRAM . . .

E. Reynolds, Allegheny Ludlum Steel Corp., and Roger Long, Ferrotherm Co.

Alloys for Brazing Thin Sections of Stainless Steel—Allen S. McDonald, Handy & Harman.

Self-Fluxing, Airproof Brazing Alloys—Nikolajs Bredzs, Armour Research Foundation.

Friday Morning, Apr. 12

(Three simultaneous sessions)

GAS-SHIELDED WELDING

Comparative Study of Thoriated, Zirconiated and Pure-Tungsten Electrodes — L. P. Winsor and R. R. Turk, Rensselaer Polytechnic Institute.

Study of Welding Arcs Using Various Atmospheres and Power Supplies—Thomas H. Hazlett and George M. Gordon, University of California.

Automatic Inert-Gas Tungsten-Arc Welding of Aluminum Alloys—Harry D. Mann, Air Reduction Sales Co., and Rawlins E. Purkhiser, Airco Equipment Mfg. Division.

PRESSURE VESSELS

Weld Cladding of Carbon and Low-Alloy Steel Plates—R. V. Fostini, J. W. Flannery and W. R. Apblett Jr., Foster Wheeler Corp.

Effect of Plastic Fatigue on Pressure Vessel Materials and Design—Lambert F. Kooistra, Babcock & Wilcox Co.

Fatigue Resistance of Simulated Nozzles in Model Pressure Vessels—Georges Welter and Julien Dubuc, Ecole Polytechnique.

SURFACING, BRAZING and SOLDERING

Mechanized Surfacing with Alloy Materials—J. H. Neely and R. S. Zuchowski, Linde Air Products Co.

Thermal Analysis of Brazing and Hard Surfacing Alloys—A Proposed Method—Forbes M. Miller, Wall Colmonoy Corp.

Zinc Soldering of Aluminum—I. B. Robinson, Aluminum Co. of America.

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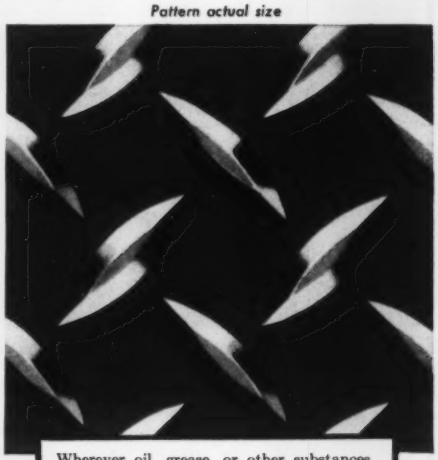

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American Welding Society's 5th Annual Welding Show

EXHIBITORS

Place:

Philadelphia's Convention Hall will house all exhibits and booths.

Exhibition hours:

Tuesday, Apr. 9, Noon to 10 p.m.

Wednesday, 10 a.m. to 10 p.m.

Thursday, 10 a.m. to 6 p.m.

Exhibitor	Booth
Acorn Iron & Supply Co., Philadelphia	606
Air Reduction Sales Co., division of Air Reduction Co. Inc., New York	334
Alloy Rods Co., York, Pa.	101
All-State Welding Alloys Co. Inc., White Plains, N.Y.	442
Aluminum Co. of America, Pittsburgh	231
American Manganese Steel Division, American Brake Shoe Co., Chicago Heights, Ill.	106
American Platinum Works, Newark, N.J.	623
American Pullmax Co. Inc., Chicago	500
American Torch Tip Co., Pittsburgh	627
Ames Spot Welder Co. Inc., Brooklyn, N.Y.	140, 141, 151
Ampco Metal Inc., Milwaukee	615
Ampower Products Co., Oak Lawn, Ill.	543
Arcair Co., Lancaster, O.	153, 155
Arcos Corp., Philadelphia	230
Aronson Machine Co., Arcade, N.Y.	434
ARO Spotwelders, division of Guthery Machine Tool Corp., Long Island City, N.Y.	300
Balteau Electric Corp., Stamford, Conn.	307
Banner Welder Inc., Milwaukee	517
Bay State Abrasive Products Co., Westboro, Mass.	614
Bernard Welding Equipment Co., Chicago	218
Brennen, Bucci & Weber, New York	252
Cam-Lok Division, Empire Products Inc., Cincinnati	440
Cayuga Machine & Fabricating Co. Inc., Depew, N.Y.	404
Champion Rivet Co., Cleveland	313
Clementina Ltd., San Francisco	609
Coast Metals Inc., Little Ferry, N.J.	308
Conner Steel Products, Detroit	628
Contour Marker Corp. of California, Compton, Calif.	235
Dockson Corp., Detroit	212
Electrons Inc., Newark, N.J.	254
Erico Products Inc., Cleveland	605
Eutectic Welding Alloys Corp., Flushing, N.Y.	200
Federal Machine & Welder Co., Warren, O.	506
Fibre-Metal Products Co., Chester, Pa.	526
Fidelity-Philadelphia Trust Co., Philadelphia	146
Frommelt Industries, Dubuque, Iowa	630

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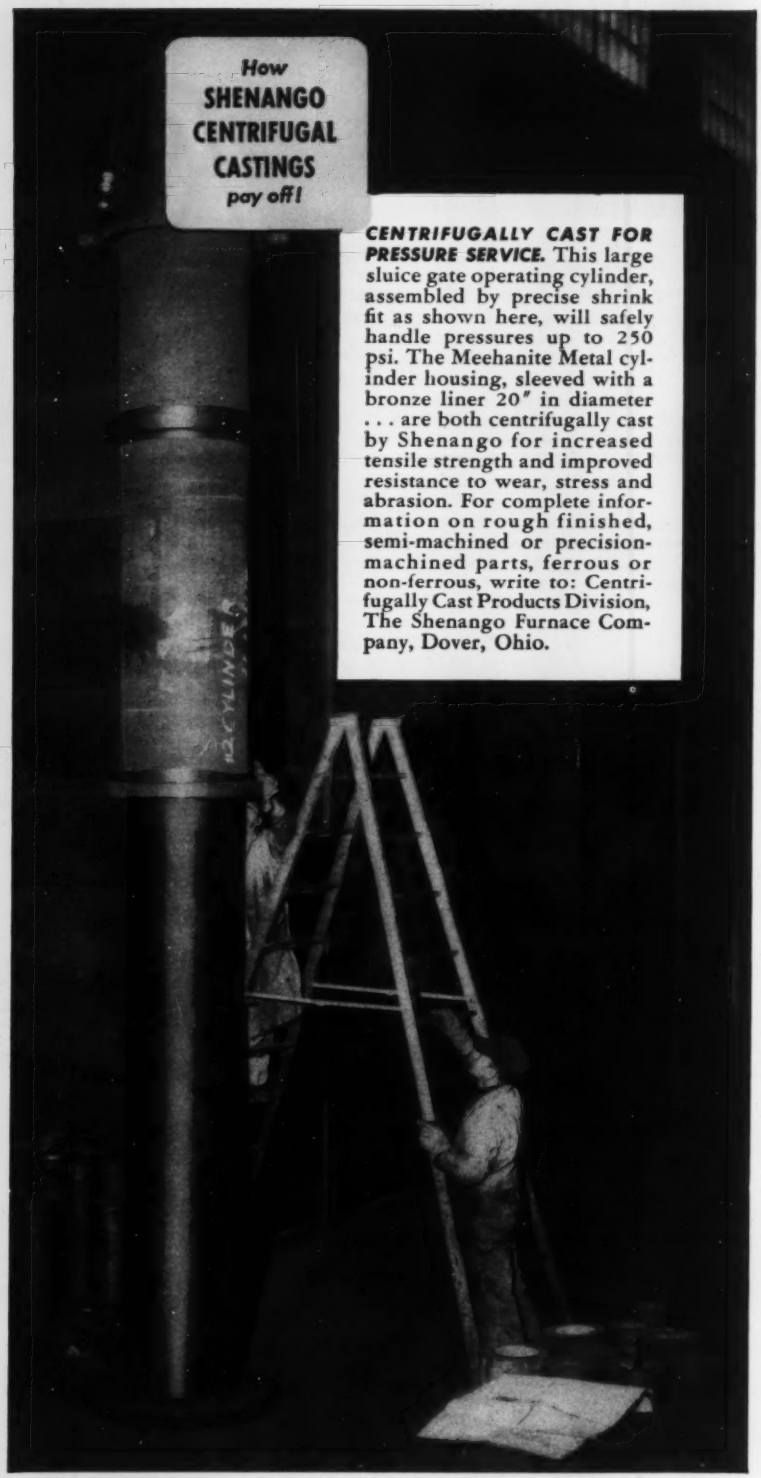
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Welding Show Exhibitors

Exhibitor	Booth
Gas Arc Supply, Philadelphia	604
General Electric Co., Schenectady, N.Y.	322
Glendale Optical Co. Inc., Valley Stream, L.I., N.Y.	139
Graham Mfg. Corp., Royal Oak, Mich.	512
Handy & Harman, New York	534
Harnischfeger Corp., Milwaukee	523
Harris Calorific Co., Cleveland	638
Haynes Stellite Co., division of UCC, New York	417
Hobart Bros. Co., Troy, O.	100
Holger Andreasen Inc., San Francisco	408
Independent Engineering Co., O'Fallon, Ill.	540
Industry & Welding Magazine, Cleveland	214
International Nickel Co. Inc., New York	327
Jackson Products Inc., Warren, Mich.	541
K-G Equipment Co. Inc., Long Island City, N.Y.	613
KSM Products Inc., Merchantville, N.J.	504
Lenco Inc., Jackson, Mo.	107
Lewis Welding & Engineering Corp., Bedford, O.	138
Lincoln Electric Co., Cleveland	316
Linde Air Products Co., division of UCC, New York	417
Magnaflux Corp., Chicago	236
P. R. Mallory Co. Inc., Indianapolis	527
McKay Co., Pittsburgh	130
Marquette Mfg. Co. Inc., Minneapolis	513
Metal & Thermit Corp., Rahway, N.J.	508
Metallizing Co. of America, New York	439
Metallizing Engineering Co. Inc., Westbury, N.Y.	509
Miller Electric Mfg. Co., Appleton, Wis.	422
Mitchell Radiation Products Corp., Norristown, Pa.	610
Modern Engineering Co., St. Louis	504A
National Cylinder Gas Co., Chicago	244
National Technical Training Services, Buffalo	607
National Torch Tip Co., Pittsburgh	135
North American Aviation Inc., Missile Development Division, Los Angeles	333
North American Philips Co. Inc., Mt. Vernon, N.Y.	134
Ohio Nut & Bolt Co., Berea, O.	535
Page Steel & Wire Division, American Chain & Cable Co. Inc., Monessen, Pa.	634
Pandjiris Weldment Co., St. Louis	126
Picker X-Ray Corp., White Plains, N.Y.	531
Precision Welder & Flexopress Corp., Cincinnati	301
Pure Carbonic Co., New York	427
J. M. Ragle Industries, Kansas City, Mo.	137
Reid-Avery Co. Inc., Baltimore	530
Robotron Corp., Detroit	516
Robvon Backing Ring Co., Elizabeth, N.J.	636
Sciaky Bros. Inc., Chicago	339
Sellstrom Mfg. Co., Palatine, Ill.	206
Sight Feed Generator Co., West Alexandria, O.	304
A. O. Smith Corp., Milwaukee	405
Smith Welding Equipment Corp., Minneapolis	113
Speedi-Burn Products Co. Inc., West Hempstead, N.Y.	631
Square D Co., Milwaukee	626
Standard Safety Equipment Co., Chicago	250
Steffan Engineering Co., Salem, O.	245
Stoody Co., Whittier, Calif.	143
Sylvania Electric Products Inc., New York	210
Taylor-Winfield Corp., Warren, O.	400
Tec Torch Co. Inc., Carlstadt, N.J.	243
Tempil® Corp., New York	629
Tweco Products Co., Wichita, Kans.	340
Uniflex Cable Division, United Metal Craft Co., Ypsilanti, Mich.	640
Unique Equipment Inc., Brooklyn, N.Y.	112
United Wire & Supply Sales, Providence, R.I.	308
Velocity-Power Tool Co., Pittsburgh	335
Vickers Electric Division, Vickers Inc., St. Louis	617
Victor Equipment Co., San Francisco	522
Wall Colmonoy Corp., Detroit	121
Webb Corp., Webb City, Mo.	600
Welding Alloys Mfg. Co., Newark, N.J.	109
Welding Engineer, Chicago	111
Martin Wells Inc., Los Angeles	102
Welsh Mfg. Co., Providence, R.I.	632
Weltronic Co., Detroit	309
Westinghouse Electric Corp., Pittsburgh	120
Wheelabrator Corp., Mishawaka, Ind.	426
Worcester Taper Pin Co., Worcester, Mass.	430
Worthington Corp., Harrison, N.J.	207

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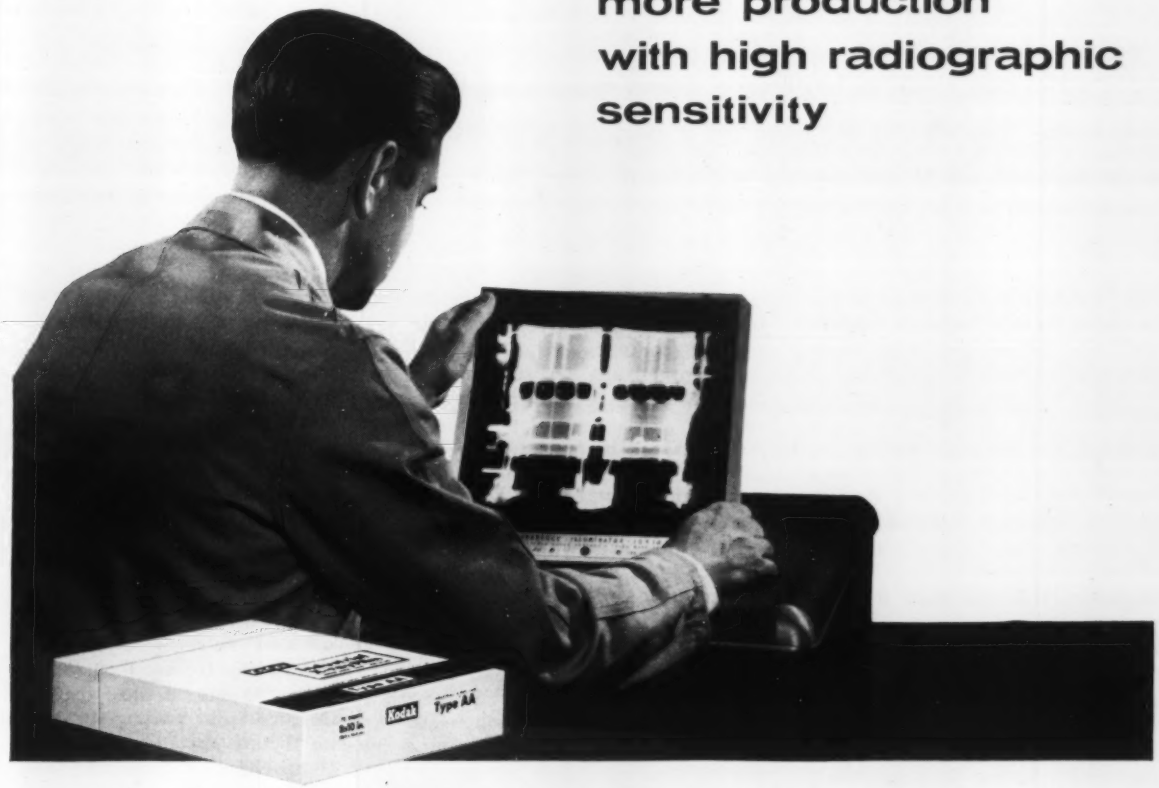

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Ceramic Tools Take the Spotlight

ASTE's Houston meeting features a dozen reports on these cutting tools. Experts cite the need for a cautious approach in putting them to work, but reveal enthusiasm over their potential

"IF CERAMICS have gone as far as these experts indicate, they're no longer laboratory toys. We're ready to try them in our plant."

That's the way a tool engineer for a large aircraft company summed up his reaction to the ceramic symposium at last week's meeting of the American Society of Tool Engineers in Houston. His conclusion was pretty typical.

First Chance—For most of the engineers, this was their first opportunity to listen to a variety of reports (12 of them) and to evaluate and ask questions about ceramic cutting tools.

They jumped at the chance. Reaction at the sessions and corridor conversations indicate clearly that ceramics have arrived. Many engineers intend to put them to work immediately. Others will delay only long enough to run preliminary tests in their plants.

Caution — Several speakers told of their experiences with ceramics on production jobs. They warned that the material is no panacea. Yet they cited ceramic's unbeatable value in many finish machining jobs.

J. F. Allen, factory manager at Houston's Cameron Iron Works Inc., found ceramics lacking when it came to rough machining heavy forgings, the major product in his plant.

But on Finishing—"We came to the early conclusion that the success of ceramics as a finishing tool is practically assured through the following of fairly simple rules."

They are: The machine tool has to have ample spindle speed and power and must be free from excessive vibration; the cutter must be well supported with a minimum of overhang; sudden shocks must be carefully avoided.

Guides—In a jointly authored paper, Alfred Haeme, tool superintendent, and Robert Hook, chief metallurgist, Warner & Swasey Co., Cleveland, said their tests showed ceramics have a "definite industrial use in finish turning operations . . . with proper care they can be used successfully on first and second operations on turret lathes . . . speed ranges of 400 to 1000 sfpm with feeds of 0.004 to 0.020 in. per revolution and depths of cut from 0.010 to 0.375 in. seem to be quite practical."

They also feel that coolant has no apparent advantage or disadvantage and that "existing clamp-on toolholders" are inadequate for ceramics.

NEW CARBIDE

Carbide tool materials that can be machined in the annealed state, then hardened, were discussed by John L. Ellis, chief engineer, Sintercast Corp. of America, Yonkers, N. Y. He likened the new materials to tool steels. He says:

"After quenching, one type attains a hardness of about 69 to 72 R_c. When fully annealed, the hardness of the same material can be reduced to 35 to 40 R_c. In this condition, the carbide can be machined by conventional chip-removing procedures on ordinary machine tools, using commercial high speed steel or carbide cutting tools."

He had this to say about applications: "Where design requirements of dies or tooling arrangements dictate carbide components of highly complex geometric form —for example, those with a multiplicity of holes, thin walls, drastic changes in cross section—conventional tool steels are preferred as construction materials in modern toolroom practice.

"Against this background, the new machinable and hardenable cemented carbide material appears to offer attractive practical possibilities for tool and die room use."

Blend—The new material is a composite. Titanium carbide is the hard, wear-resistant phase. Steel is the cementing agent or binder. The material is produced by a sequence of operations which start with the compacting of graded and specially conditioned titanium carbide powder in tool steel dies. It's subsequently infiltrated with molten steel under vacuum. The finished billet is annealed and machined on all surfaces.

The physical properties of the material indicate it's compatible with steel. It means that it probably will be good as a carbide facing on steel backing. Successful,

In Two Weeks

Ceramic cutting tools and plastic tooling will be subjects of an article in STEEL's Apr. 15 issue. It will include a comprehensive report on developments brought out at the ASTE meeting.

stress-free assemblies have been made, for example, with the Heliarc welding process.

PLASTICS

A second symposium was designed to fill a gap in information about plastic tools. Walter J. Arrufat, associate engineer at International Business Machines Corp., Endicott, N. Y., points out that although aircraft and automotive tooling specialists have accepted plastics for some tools, "the small parts manufacturers are much slower to accept this new and economical means for the construction of tools."

One of the reasons, he thinks, is that "tool engineers do not have enough information on plastic tooling."

Where?—Most common uses for plastic tools are for models and templates, fixtures, stretch forms, rubber pad press forms and hammer forms for hand forming sheet metal.

Other, more severe jobs may open up to plastics, however, as a result of basic improvements in the material. Lewis F. Bogart, sales engineer, Marblette Corp., Long Island City, N. Y., hints that: "Since the emergence of plastics able to withstand moderate loads and stresses at temperatures over 400°F, new interest has been shown in using them to form hot metals."

This would open up a new area, particularly in forming magnesium and titanium.

How Short? — Most publicity about plastic tooling has talked about its work in metal forming. The publicity has been good and bad. The bad usually points up the limitation of plastics on production runs.

Yet when they are applied right, according to William Weaver, president, Modern Pattern & Plastics Inc., Toledo, O., "plastic dies have, in most cases, proved considerably less costly (than metal dies) and have done an excellent job."

Success with plastic dies, he warns, may depend on the die design job. "An analysis of forces acting within the drawn metals will prove of value in helping to detect possible areas of failure on the plastic die."

Tool Topics

MORE than 40 tooling experts discussed trends in tooling at Houston. Here is a sample of what they said in the symposiums on ceramic and plastic tools:

Plastics

"Emergence of much higher impact materials and better fabrication should lead to more success in drop hammer dies of plastic." *Lewis F. Bogart, sales engineer, Marblette Corp., Long Island City, N. Y.*

"The largest applications of plastic tools in operation today are those related to the gage and fixture category." *William Weaver, president, Modern Pattern & Plastics Inc., Toledo, O.*

"Highest strength properties are found in laminates employing thin glass cloths, at least on the outer stressed surface. Over-all strength decreases as the fabric thickness increases." *Lloyd J. Oye, marketing director, Rezolin Inc., Los Angeles.*

Ceramics

"The advantage of the ceramic tool is greatest when the feed and depth of cut are light." *Norman Zlatin, consultant, Wright Aeronautical Division, Curtiss-Wright Corp., Wood-Ridge, N. J.*

"The use of cutting fluids has not shown to advantage as far as our experience has gone in machining with cemented oxides. The cutting tip remains cool even when cutting dry." *E. J. Weller, manager, Carbide Products Design Engineering, Metallurgical Products Department, General Electric Co., Detroit.*

"Recently it has been found possible to soft solder (ceramic) tips to shanks and obtain an adequate bond for even severe cuts." *Robert F. Rea, manager, product engineering, Stupakoff Division, Carborundum Co., Latrobe, Pa.*

"We do not feel that present clamp-on toolholders are adequate for use with ceramics as they are today." *A. O. Haeme, tool superintendent and R. T. Hook, chief metallurgist, Warner & Swasey Co., Cleveland.*

"The safest approach to the use of ceramic cutters is one of restrained enthusiasm. They are completely unpredictable, often incorrigible and unstable. They are, in spite of these characteristics, capable at times of outperforming other known materials to a degree that demands healthy respect." *J. F. Allen, factory manager, Cameron Iron Works Inc., Houston.*

General Chemical Expands

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...Additional Capacity Now On Stream At Newell, Pa.

To supply growing demands for nitric acid by industrial and military users, General Chemical has made a major increase in the capacity of its large Newell, Pa., facilities.

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Offices: Albany • Atlanta • Baltimore • Birmingham • Boston • Bridgeport • Buffalo • Charlotte • Chicago • Cleveland • Denver • Detroit Greenville (Miss.) • Houston • Jacksonville • Kalamazoo • Los Angeles • Milwaukee • Minneapolis • New York • Philadelphia • Pittsburgh Providence • San Francisco • Seattle • St. Louis • Yakima (Wash.) **In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver**

On Display at the Show

Flame Cutoff Machine Handles 24-In. Pipe

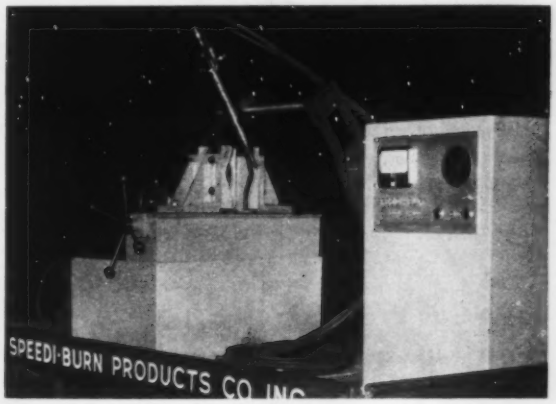
This machine does straight cutoff and beveling operations on medium and large pipe and bar stock.

The torch is mounted radially for cutting off pipe and describes a complete revolution about the work.

A secant action is used for bar stock cutting; the torch head describes only part of a revolution. Built-in safety limit switches stop rotation of the torch head at the completion of the cut.

The machine bevels pressure piping accurately and uniformly. The torch is mounted in an adjustable angle clamp easily set to the desired bevel angle.

The torch head is driven through an electronic type variable speed drive. Bar stock or pipe is held in a self-centering vise. *Write*: Speedi-Burn Products Co., 534 Linden St., West Hempstead, N. Y. (Welding Show Booth 631)



Motor-Generator Welders Control Current Peaks

This line can be used for light, medium and heavy direct current metal arc and inert arc welding.

The unit includes generator, driving motor and accompanying controls—all encased in a weather resistant, self-ventilated case.

A penetrating arc is produced by the transformer reactor and the generator. The Bergman split-pole principle is used by the generator which is self-excited from an independent third brush.

A magnetic starter with bimetallic thermal overload relays prevents the motor from being burned out if it is overloaded.

The relays will kick out in less than 10 seconds in stalled single phase and in less than 8 seconds if the rotor is locked in normal 3-phase operation. *Write*: General Electric Co., Schenectady 5, N. Y. *Phone*: Franklin 4-2211 (Welding Show Booth 322)

Portable Spotwelder Weighs Only 26 Lb

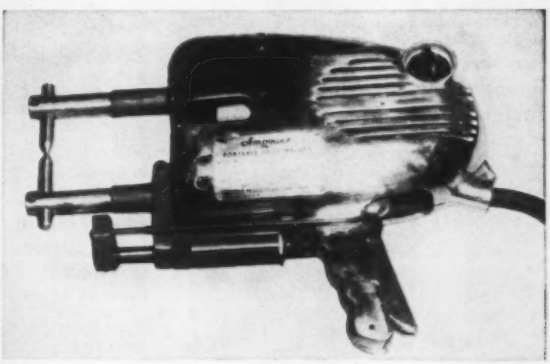
Model 55 has an electric timing control which assures good welds.

Transformer, switch and electronic controls are contained in an aluminum housing. A pistol grip makes the welder easy to handle and operate.

The transformer is suspended in the housing. It's free on all sides to allow for complete circulation of air and rapid dissipation of heat.

Metals with $\frac{1}{8}$-in. of combined thickness can be welded.

Standard models have a throat depth of 7 in. and a 3-in. opening. *Write*: Ampower Products Co., 10207 S. Ridgeland Ave., P.O. Box 464, Oak Lawn 70, Ill. *Phone*: Garden 2-0305 (Welding Show Booth 543)



NEW PRODUCTS and equipment

Battery Lights Torch

Type AB Torch-O-Matic lights automatically when the operator presses the ignition switch.

When the torch is released, the gas shuts off automatically. *Write*: Velocity-Power Tool Co., 201 N. Braddock Ave., Pittsburgh 8, Pa. *Phone*: Churchill 1-9200 (Welding Show Booth 335)

Inert Gas Welding

This water cooled torch is for tungsten inert gas welding of aluminum alloys, magnesium alloys, nickel and nickel base alloys, stainless steel, brasses, silver, copper, copper-nickel, silicon-copper, phosphor-bronze, plain carbon and low alloy steels, cast iron, Hastelloy and Multimet alloys.

The Visuweld torch has a working range up to 300 amperes and comes in pencil grip and angled head models. *Write*: Tec Torch Co. Inc., 300 Paterson Ave., Carlstadt, N. J. *Phone*: Webster 9-0902 (Welding Show Booth 243)

Parts for Weldments

Structures of many weldments are strengthened, modernized and improved by this line of standard prefabricated parts.

U and V-type formed steel braces provide load support and easy alignment of weldment parts, improve appearance and eliminate hand finishing.

Spherical corners are used in production of short run lots of panels, cabinets, pans, trays, tanks, boilers and machine bases. They come in mild steel, stainless steel or aluminum. *Write*: Conner Steel Products, 24690 Telegraph Rd., Detroit 19, Mich. *Phone*: Elgin 6-6683 (Welding Show Booth 628)

Adapters and Tips

Torch head reseating and tip nut replacement are reduced with this line of Multi-Use adapters and tips. Only one adapter is needed for each torch. Tips are available in six standard series—each offers a complete range of sizes.

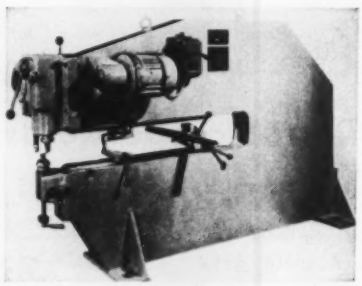
Operators can switch from one fuel gas to another simply by changing to the correct type of tip. *Write*: American Torch Tip Co., 629 S. Millvale Ave., Pittsburgh 24, Pa. *Phone*: Museum 1-1700 (Welding Show Booth 627)

Shearing and Forming

This line of universal machines cuts shapes prior to welding.

The machines operate with a reciprocating upper tool and a stationary lower tool. These tools leave an edge that needs no further finishing.

With only a change of tools, the machines can be used for straight,



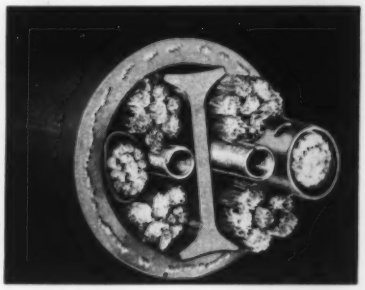
circular or irregular cutting, as well as beading, joggling, dishing, louvering, slot cutting, flanging and edge bending.

An outside center device makes it possible to cut circles of unlimited diameters. Mild steel up to 11/32-in. can be cut. *Write*: American Pullmax Co. Inc., 2455 N. Sheffield Ave., Chicago 14, Ill. *Phone*: Diversey 8-5727 (Welding Show Booth 500)

Welding Cable

The Kickless cable is for portable resistance welding tools. It consists of two large conductors composed of fine wire.

The conductors are insulated by a flexible separator and encased in a wear resistant hose. Lightweight



terminals are used. *Write*: Uniflex Cable Division, United Metal Craft Co., subsidiary of Gar Wood Industries Inc., Ypsilanti, Mich. (Welding Show Booth 640)

Spotwelding Gun

The P 298 is easy to maneuver because the welding transformer is directly behind the electrodes.

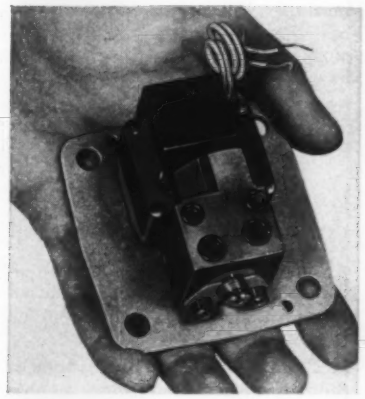
The water-cooled unit has an unhooking device which drops the lower arm and triples the normal jaw gap to place the tips behind bulky profiles, gusset plates and other obstacles.

One hand pressing on the operating lever closes the electrodes, applies pressure and switches on the welding current. *Write*: Aro Spot Welder Division, Guthery Machine Tool Corp., 38-31 Crescent St., Long Island City 1, N. Y. *Phone*: Exeter 2-4090 (Welding Show Booth 300)

Air Valve Is Small

This four-way valve is for mounting on the end of the cylinder of a portable welding gun. It increases speed and improves performance by making line pressure available at the cylinder. A return line from the cylinder is not needed.

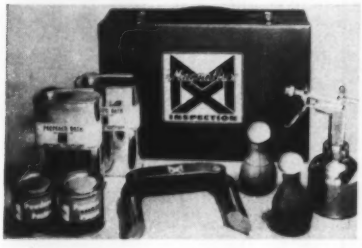
The operating armature of the valve rotates and is mounted di-



rectly on the valve rotor. Air pressure is always balanced on opposite sides of the rotor. *Write*: Square D Co., 4041 N. Richards St., Milwaukee 12, Wis. *Phone*: Edgewood 2-2000 (Welding Show Booth 626)

Weld Inspection

The YM-5 is a portable kit used to find all types of surface cracks on large and small parts.



There are no electrical connections, and arcing is not possible. The magnetic circuit uses two magnets, one in each leg of the yoke. *Write*: Magnaflux Corp., 7300 W. Lawrence Ave., Chicago 31, Ill. *Phone*: Underhill 7-8000 (Welding Show Booth 236)

Welding Wire

Aircomatic wire up to ⅛-in. in diameter is for high duty cycle production welding with argon, helium and carbon dioxide shielding. Also on display: Lime coated stainless steel electrodes, arc welding machines and an inert gas spotwelder. *Write*: Air Reduction Sales Co., a division of Air Reduction Co. Inc., 150 E. 42nd St., New York 17, N. Y. *Phone*: Murray Hill 2-6700 (Welding Show Booth 334)

Blast Cleaning

This swing table airless machine removes rust and corrosion from metals before they are welded, soldered or brazed to improve the bond.

It also cleans them after joining to remove rust, flux, spatter, scale and discoloration.

The machine illustrated is for job welding shops handling a wide variety of weldments. It throws metallic shot or grit abrasive at high velocity. The work rotates on a circular table.

The table is mounted on the door to make loading and unloading easy. *Write*: Wheelabrator Corp., 1157 S. Byrkit St., Mishawaka, Ind. *Phone*: Blackburn 5-2141 (Welding Show Booth 426)

Welding Positioner

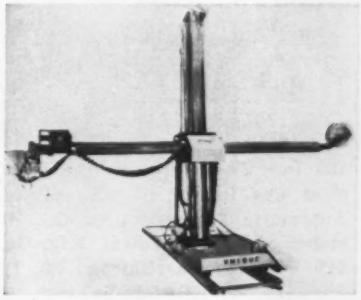
Model UP-1000 maintains static balance, permitting free-hand rotation of the weldment to any position within its horizontal, vertical or intermediate planes.

Capacity of the unit is 1000 lb.

Write: Harnischfeger Corp., 4400 W. National Ave., Milwaukee 46, Wis. *Phone*: Orchard 1-4400 (Welding Show Booth 523)

Manipulator

The Precision welding head manipulator features boom leveling and lateral adjustment of the track.



Sizes range from models with a 6-ft mast and a 6-ft boom to those with a 12-ft mast and a 14-ft boom. *Write*: Unique Equipment Inc., 122 Sumpter St., Brooklyn 33, N. Y. *Phone*: President 2-9494 (Welding Show Booth 112)

Brazing Materials

Nicrobraz flux is for high temperature brazing alloy service. Flux 6-20 is used with complex hardfacing alloys and hard to weld materials.

C-250 powder is for reclamation and modification of internal combustion engine and compressor crankshafts. *Write*: Wall Colmonoy Corp., 19345 John R. St., Detroit 3, Mich. *Phone*: Twinbrook 3-3800 (Welding Show Booth 121)

Lift Truck

This electrically operated truck has a capacity of 1500 lb, yet the distance from the heel of the forks to the end of the truck is only 47⅝-in.

Use of high, narrow batteries rather than the lower and longer standard type made shortness possible. They have a capacity of 500 to 700 amperes an hour—enough to run for a full 8-hour shift without being recharged.

Turning radius is 49½-in. Traveling speed is 5 mph.

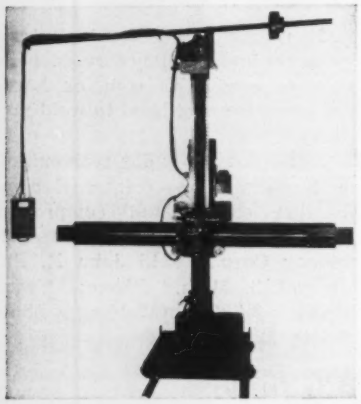
The model with a mast height of 83 in. has a lifting height of

135 in. The one with the 68-in. mast has 105 in. of lift. *Write*: Automatic Transportation Co., division of Yale & Towne Mfg. Co., 149 W. 87th St., Chicago 20, Ill. *Phone*: Radcliffe 3-7000

Manipulator

The Warrior is a ram type pedestal manipulator with a powered truck.

Also on display: Center post positioners, turning rolls and a



seamer. *Write*: Cayuga Machine & Fabricating Co. Inc., 200 W. Gould Ave., Depew, N. Y. *Phone*: Regent 1270 (Welding Show Booth 404)

Cast Iron Electrode

No. 8-60 is a machinable electrode of 55 to 60 per cent nickel alloy coated with a new flux.

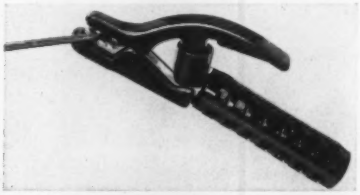
It is recommended for welding high phosphorus irons, work requiring higher strength in the weld area and heavy sections. Test sections have up to 60,000 psi tensile strength and 8 per cent elongation.

Alternating current or direct current reverse polarity at 40 to 180 amperes is used. No preheating is needed. *Write*: All-State Welding Alloys Co. Inc., 249-55 Ferris Ave., White Plains, N. Y. *Phone*: White Plains 8-4646 (Welding Show Booth 442)

Electrode Holder

The Tong-Grip holder delivers 300 amperes on a heavy duty cycle when connected to a 00 cable.

There is no current in the hinge pin or upper tong. Insulators are glass.



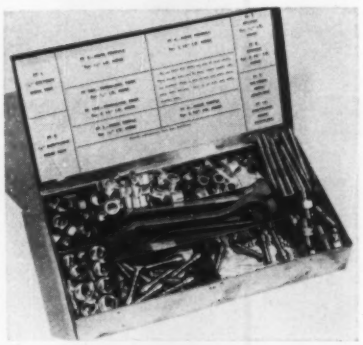
The holder has nine parts and can be assembled or taken apart in seconds. *Write*: Martin Wells Inc., 5886 Compton Ave., Los Angeles 1, Calif. *Phone*: Ludlow 1-6268

Spotwelder

The Size 1 automatic press type welder is operated by air. It has a single phase, cold cathode, counting tube control panel. *Write*: Federal Machine & Welder Co., Warren, O. *Phone*: 4252-1 (Welding Show Booth 506)

Hose Repair Kit

This kit includes tools and replacement parts for on-the-job repair of ¼ or 3/16-in. ID cutting or welding hose.



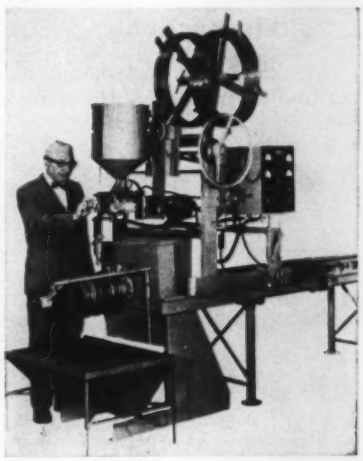
Operations that can be performed include: 1. Putting a new nipple-ferrule-nut assembly on the end of a hose. 2. Permanently splicing two lengths of hose. 3. Temporarily coupling two sections of hose. *Write*: Gas Arc Supply, 223 N. 16th St., Philadelphia 2, Pa. *Phone*: Rittenhouse 6-4384 (Welding Show Booth 604)

Automatic Positioner

Rexarc RP-73-X is for welding rollers of crawler type tractors, idlers and other circular and conical objects.

The positioner with a longitudinal tractor rail welding machine will rebuild rollers, idlers or rails automatically.

The unit is attached to the end of the longitudinal rail welder, so that welding of circular objects can begin without shifting the welding head, control box or welding apparatus.



The positioner tilts easily for flange or flat circular work. *Write*: Sight Feed Generator Co., 38 E. Third St., West Alexandria, O. (Welding Show Booth 304)

Cutting Torch

Gasoline is the fuel for this torch.

One gallon of unleaded fuel will cut 700 ft of ½-in. steel plate.

The speed for ½-in. plate is 24 ipm. High heat release of the oxy-gasoline flame reduces the cooling rate, making edges soft and easy to machine. *Write*: Worcester Taper Pin Co. Inc., Box

Gradall tearing down brick work of open-hearth furnace.

Within 2 to 3 hours, a Gradall completely removes all brick including the dropping of the roof.

Gradall cuts open-hearth downtime 75%

Digging out loose brick. One Gradall replaces a crew of 25 men who previously worked 10 to 12 hours to complete the same job.

Here's a report of the outstanding performance record of a Crawler-Mounted Gradall at a prominent steel mill:

1. **Tear-down time of an open-hearth furnace reduced 75%.**
2. **Sharp cost reduction in furnace tear-down.**
3. **Furnace back in operation 22 to 24 hours quicker than with previous methods.**
4. **When not engaged in furnace work, Gradall cleans slag pockets and checkers; handles road maintenance, track maintenance, material handling and general mill construction work.**

By adding nearly a full day's production to open-hearth furnace operation, this Gradall will more than pay for itself within a very short time.

Before investing in any other maintenance equipment, see how a multi-purpose Gradall gives you more producing hours every year.

Gradall®
DIVISION OF WARNER & SWASEY
® Reg. U.S. Pat. Off.

YOU CAN DO IT BETTER, FASTER, FOR LESS WITH A GRADALL

GRADALL DIVISION — Dept. S-4
Warner & Swasey Company
5701 Carnegie Avenue, Cleveland, Ohio

Please send me free folder on new methods for increasing steel production.

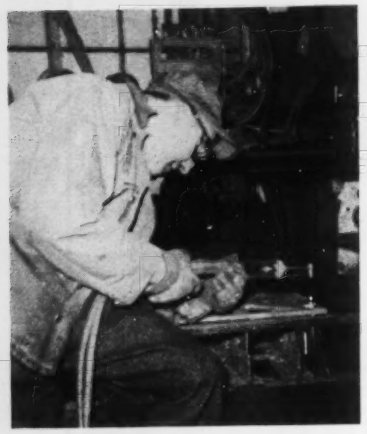
Name _____ *Title* _____

Company _____

Address _____

City _____ *Zone* _____ *State* _____

NEW PRODUCTS and equipment



171, Worcester 1, Mass. *Phone*: Pleasant 3-2982 (Welding Show Booth 340)

Aluminum Brazing

This self-fluxing aluminum alloy is a powder. It's for brazing aluminum assemblies. *Write*: Handy & Harman, 82 Fulton St., New York 38, N. Y. *Phone*: Beekman 3-2460 (Welding Show Booth 534)

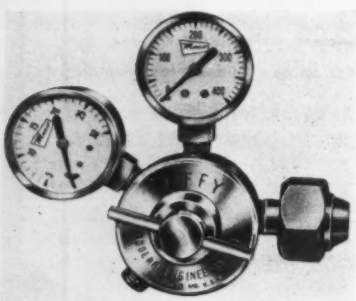
Welding Rods

Ni-Rod and Ni-Rod 55 are used in welding cast irons, including ductile iron, Ni-Resist and high engineering types. *Write*: International Nickel Co. Inc., 67 Wall St., New York 5, N. Y. *Phone*: Whitehall 4-1009 (Welding Show Booths 327, 331)

Regulator

The Jiffy uniformly maintains the pressure of air-acetylene torches between 0 and 10 lb.

The regulator takes an MC or B tank coupling and provides a $\frac{3}{8}$-in. left-hand hose connection. *Write*: Modern Engineering Co., 3411 Pine Blvd., St. Louis 3, Mo. *Phone*: Jefferson 3-8250 (Welding Show Booth 540)



Positioner

This tool has a capacity of 3000 lb. Also on display: 18,000-lb capacity turning rolls, semiautomatic manipulator and a light duty manipulator for automatic welding heads. *Write*: Pandjiris Weldment Co., 5151 Northrup Ave., St. Louis 10, Mo. *Phone*: Prospect 6-6893 (Welding Show Booth 126)

Helmet Improves Vision

The Wide Vision welding helmet has a $4\frac{1}{2}$ x $5\frac{1}{4}$-in. glass. Its wide field reduces fatigue.

Equipment includes a ratchet headgear, floating headgear suspension and a chin rest. *Write*: Fibre-Metal Products Co., Chester, Pa. (Welding Show Booth 526)

Temperature Indicating

Tempilaqs° are liquids used to determine temperatures in welding operations. Temperature sensitive solids mixed with the liquids are ground to micron size to minimize settling rates. *Write*: Tempil° Corp., 132 W. 22nd St., New York 11, N. Y. *Phone*: Oregon 5-6610 (Welding Show Booth 629)

Positioner

This welding tool has a four-post geared elevation. Its four-speed transmission is coupled to a variable speed drive to provide the precise slow and fast positioning speeds needed for various types of weldments. *Write*: Aronson Machine Co., Arcade, N. Y. (Welding Show Booth 434)

Spotwelder

The PMCO 6STK, said to be one of the world's largest spotwelders, uses a predetermined counter control which produces absolute and consistent settings. *Write*: Sciaky Bros. Inc., 4915 W. 67th St., Chicago 38, Ill. *Phone*: Portsmouth 7-5600 (Welding Show Booth 339)

Cable Conveyor Supports

Here are standardized floor-mounted supports that simplify the installation of overhead cable conveyors.

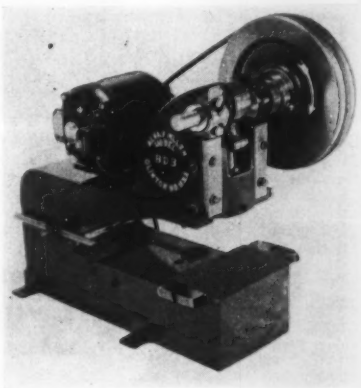
The supports are made of standardized interchangeable parts, but may be easily tailored to particular requirements. They eliminate problems involved in installing cable conveyors when roofs are weak, too high or cluttered with other supports for equipment and utilities.

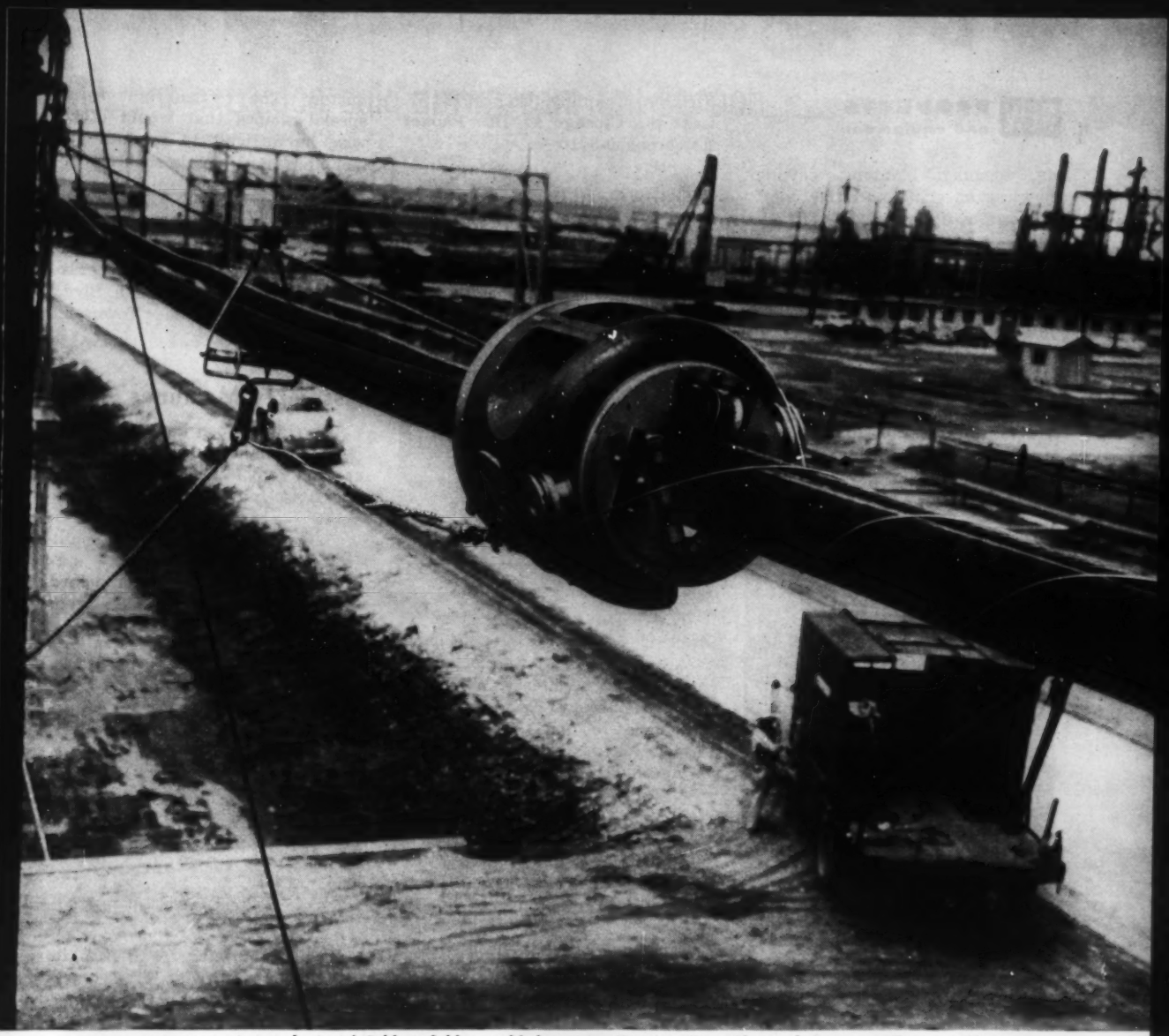
Hollow pipe stanchions are used with standard brackets and adapters. Bolts are used exclusively in assembly.

Supports may be lag bolted to the floor or simply placed on the floor and sway-braced to plant walls. *Write*: Tipp Mfg. Co., Tipp City, O.

Press Has 12-In Throat

Model BD-3 is a 3-ton punch press which will perform up to 300 operations a minute—punch-





15,000 VOLT Anaconda Aerial Cable is field-assembled at Texas Division, Dow Chemical Company, Freeport, Texas.

This overhead cable reduces overhead costs!

Down time and repairs are costly—when storms knock out ordinary overhead lines. The answer is Anaconda Aerial Cable. This strong, sturdy cable gives peak protection against wind, snow, rain or sleet damage . . . offers *dependability and long-term economy!*

Aerial cable is easy to handle during installation—easy to splice, tap and terminate.

And, in plants where underground pipes or structures make installation of ducts or buried cable impossible or difficult, Anaconda Aerial Cable is ideal.

Neoprene jacket resists weather and abrasion. Special Anaconda Type AB butyl rubber high-voltage insulation gives extra protection against ozone, heat, moisture and fumes.

Ask the Man from Anaconda for full information on Anaconda's three types of Aerial Cable: 1) factory-assembled, 2) field-assembled, and 3) reverse-lay for easy tapping. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

57337

SEE THE MAN FROM ANACONDA®
FOR AERIAL CABLE

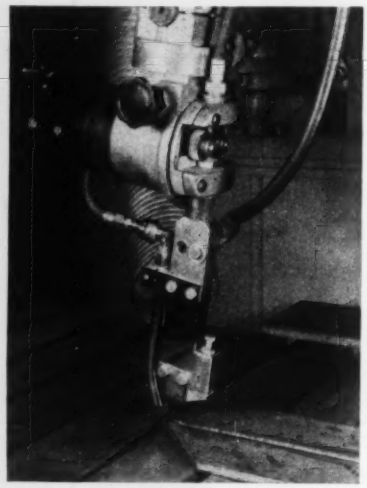
ing, forming, blanking, cutting, drawing, shearing and riveting.

Accurate fitting of dies for precision stamping is assured by straight ram guides with flat gibs.

Standard stroke is ¾-in. *Write*: Alva Allen Industries, Clinton, Mo. *Phone*: 1286

Welding Torch

This dry-type CO_2 torch for automatic Fillerarc welding is interchangeable with the standard water cooled attachment to an automatic wire feeder.



The torch is rated for 800-ampere operation. Its inverted pyramid tip design deflects spatter and reduces the possibility of spatter build-up.

Tips which can handle wire 0.045 to ⅛-in. come with the torch. *Write*: Welding Department, General Electric Co., Schenectady 5, N. Y. *Phone*: Franklin 4-2211

Variable Speed Pulleys

Models 175 and 180 are 1 and 1½-hp pulleys with a speed ratio of 2½:1. They have no parts needing frequent adjustment.

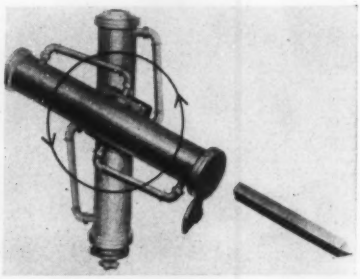
The pulleys are installed easily on old or new equipment. They're used where speed changes are needed at once to compensate for variations in production schedules or differences in the ability of operators.

Both models use standard B-section V-belts. *Write*: Lovejoy Flexible Coupling Co., 4975 W. Lake St., Chicago 44, Ill. *Phone*: Estebrook 9-3010

Water-Cooled Mold

The Free Easy mold provides a fine-grain finish on wire bars.

A cooling water channel runs the full length of the mold. This speeds cooling and enables the bars to slip free without sticking.



The bars can be pulled or dropped 4 minutes after pouring.

A nonleaking, water-cooled expansion joint eliminates the hazard of seal blowout. *Write*: Kruger Machines Inc., 545 Grove Ave., Woodbridge, N. J. *Phone*: Woodbridge 8-0017

Cleaner for Aluminum

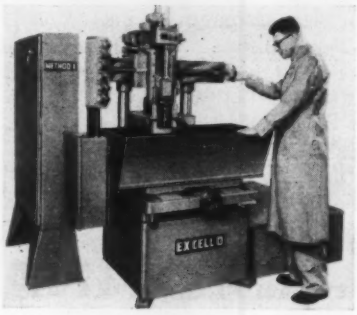
Identification inks, grease, oils and other heavy marks can be removed from aluminum by No. 164 cleaner.

The compound will clean without foaming in agitated tanks.

Solutions of 6 to 8 ounces per gallon of water are used at temperatures between 160 and 180°F. *Write*: Oakite Products Inc., 134E Rector St., New York 6, N. Y. *Phone*: Whitehall 3-0940

Electrospark Machine

Model 243-6 will pierce, drill, trepan, tap or sink a cavity in any material that is an electrical conductor. The vertical unit forms special shapes that would otherwise be difficult to produce and machines hard metals such as carbides.

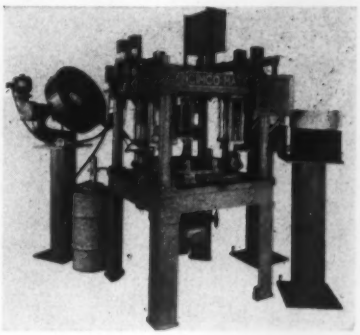


The worktable is mounted on slides so that the work can be positioned under the tool. The machine feeds the tool. *Write*: Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich. *Phone*: Townsend 8-3900

Assembly Machines

The simple open design of these machines makes them easy to operate and retool. The machine illustrated assembles 900 horn parts an hour.

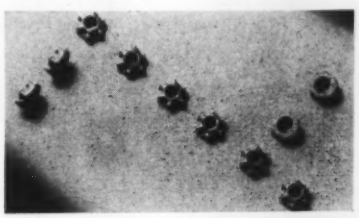
The special machines are built from standard units. Work stations are designed around standard tooling supports suspended from the top plate.



Index tables, 16, 24 and 36 in. in diameter, provide 6, 8 or 12 work stations. *Write*: Cimco Engineering Co., Ann Arbor, Mich. *Phone*: Normandy 3-3378

Locknut Saves Weight

These aircraft locknuts are up to 43 per cent lighter than conventional types.

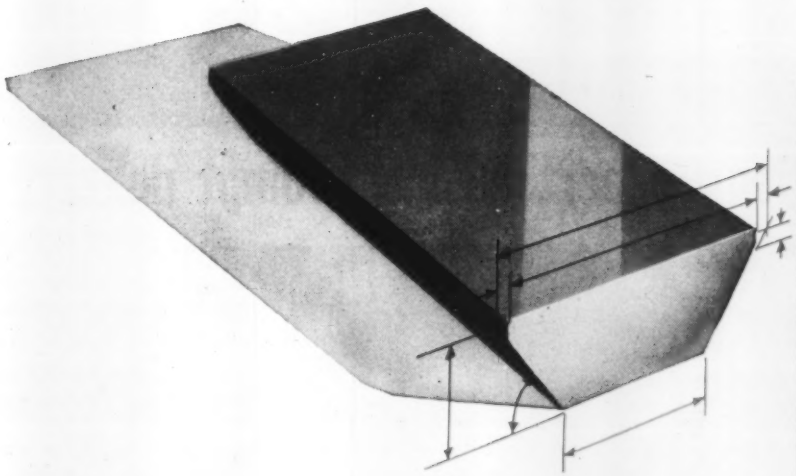


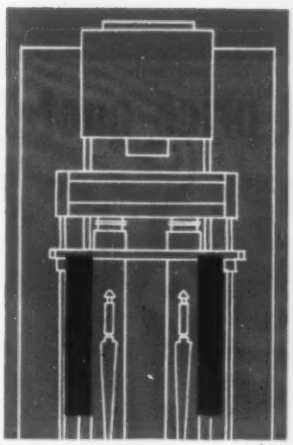
The self-locking fasteners are available in 10-32 and ¼-28 sizes. They conform to AN-N-10 and MIL-N-25027 specifications. *Write*: Standard Pressed Steel Co., Jenkintown, Pa.

J&L hot extruded cold drawn cam rail section

cuts machining cost

from $1.75 to 75¢ per foot





"This part was previously milled from a cold rolled section at a cost of approximately $1.75 per running foot. Our present cost is 75¢ per foot using your cold drawn extruded section." This machine tool manufacturer cut his production costs by buying these exclusive J&L steel sections. You can obtain similar savings:

1. Eliminate machining and finishing operations.
2. Reduce scrap losses almost to zero.
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4. Reduce inventories because extrusions are quickly available.

Investigate this new production technique for your shape profiles—within present limits of a design which can be inscribed in a three-inch circle. You'll surely boost production, cut overall cost. For complete details write to the Jones & Laughlin Steel Corporation, Dept. 404, 3 Gateway Center, Pittsburgh 30, Pa.

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For general information on Superior tubing, get a free copy of Bulletin 40. Write Superior Tube Company, 2005 Germantown Ave., Norristown, Pa.

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NEW literature

Write directly to the company for a copy

Welding Chart

Wall chart EW-198 gives instructions on the use of electrodes and shows types of joints, typical welding positions, standard steel shapes and the causes of common welding troubles. Hobart Bros. Co., Hobart Square, Troy, O.

Conversion Chart

This wall chart includes conversions for engineers and shop men. Precision Equipment Co., 3716 N. Milwaukee Ave., Chicago 41, Ill.

Continuous Furnaces

Bulletin SC-177, 4 pages, depicts standard rated continuous heat treating furnaces. Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.

Tooling Directory

About 1000 tool and die shops and the services they offer are listed in this 68-page booklet. National Tool & Die Manufacturers Association, 908 Public Square Bldg., Cleveland 13, O.

Indicator Gage

Uses of an adjustable indicator gage are illustrated in this 4-page bulletin. Ellstrom Inc., 22038 Beech Rd., Dearborn 8, Mich.

Broacher

This 8-page bulletin describes vertical, twin ram broaching machines. Detroit Broach & Machine Co., Rochester, Mich.

Screw and Rivet Headers

Bulletin 783-A-4, 4 pages, describes solid die, double stroke crank headers. Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

Platinum

This 36-page review covers research and developments in industrial applications of platinum. Department P.T., Platinum Works, J. Bishop & Co., Malvern, Pa.

Fixtures

This 8-page bulletin describes fixtures used in plumbing, heating, air conditioning and sprinkler systems. Huppower Division, Hupp Corp., 7450 Melville Ave., Detroit 17, Mich.

Press Brakes

Specifications and capacities of 40 sizes of steel press brakes are listed in bulletin 57PR, 4 pages. Dreis & Krump Mfg. Co., 7400 S. Loomis Blvd., Chicago 36, Ill.

Rotating Brushes

This 4-page bulletin describes brushes used to clean conveyor belts, spread materials, remove dust and finish metals. Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

Fasteners

A line of screws, nuts, bolts and washers made of stainless steel and aluminum is described in a 4-page bulletin. Accurate Threaded Fasteners Inc., 2901 Montrose Ave., Chicago 18, Ill.

Copper Brazing

There are two reports on the service life of woven wire conveyor belts operating at 2050°F. One is a technical paper, the other is a brief cartoon version. Cambridge Wire Cloth Co., Cambridge, Md.

Resistance Welding

Bulletin 5-#1, 16 pages, presents the production welding experience of a farm implement manufacturer. Resistance welding of butane gas cylinders is covered in a 24-page bulletin. Department L-15, Sciaky Bros. Inc., 4915 W. 67th St., Chicago, Ill.

Screw Conveyor Drives

A line of shaft mounted speed reducers is covered in bulletin SCD-57, 8 pages. American Pulley Co., 4201 Wissahickon Ave., Philadelphia 29, Pa.

Powdered Metal Parts

Design, engineering and use of bearings, machine parts, infiltrated parts, pole pieces and plated parts made of powdered sintered metal are discussed in this 24-page bulletin. Bunting Brass & Bronze Co., 715-55 Spencer St., Toledo 1, O.

Locknuts

Dimension tables on locknuts and semifinished nuts and data on wrench torques are included in this 12-page bulletin. MacLean-Fogg Lock Nut Co., 5535 N. Wolcott Ave., Chicago 40, Ill.

Staging Fixture

Positive staging of small parts on optical comparators is discussed in this 8-page bulletin. Optical Gaging Products Inc., 26 Forbes St., Rochester 11, N. Y.

Surface Grinder

This 4-page bulletin describes a grinder with a platen working area 6 x 12 in. Harig Mfg. Corp., 5751 W. Howard St., Chicago 31, Ill.

Welding Power

This 4-page bulletin describes a rectifier-type welder which has a controlled arc power supply and is used for semiautomatic and automatic operation. Metal & Thermit Corp., Rahway, N. J.

Electric Heaters

Catalog GEC-1005H, 72 pages, describes heaters and heating devices and includes formulas for calculating power requirements. General Electric Co., Schenectady 5, N. Y.

Turret Drilling

This 20-page bulletin presents case histories of a wide variety of turret drilling operations. Howe & Fant Inc., East Norwalk, Conn.

Shape Cutting

Uses of a portable gas cutting machine are described in bulletin ADC 660B, 8 pages. Air Reduction Sales Co., a division of Air Reduction Co. Inc., 150 E. 42nd St., New York 17, N. Y.

Punch Presses

Turret presses equipped with a direct measuring gage and table are described in bulletin 500DM, 6 pages. Department 504, Wiedemann Machine Co., 4272 Wissahickon Ave., P.O. Box 6794, Philadelphia 32, Pa.

NEW BOOKS

Symposium on Steam Quality, American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. 49 pages, $1.75.

The boiler feedwater committee sponsored this symposium. It reviews practices and introduces new techniques for obtaining information on steam purity for use in modern steam generators.

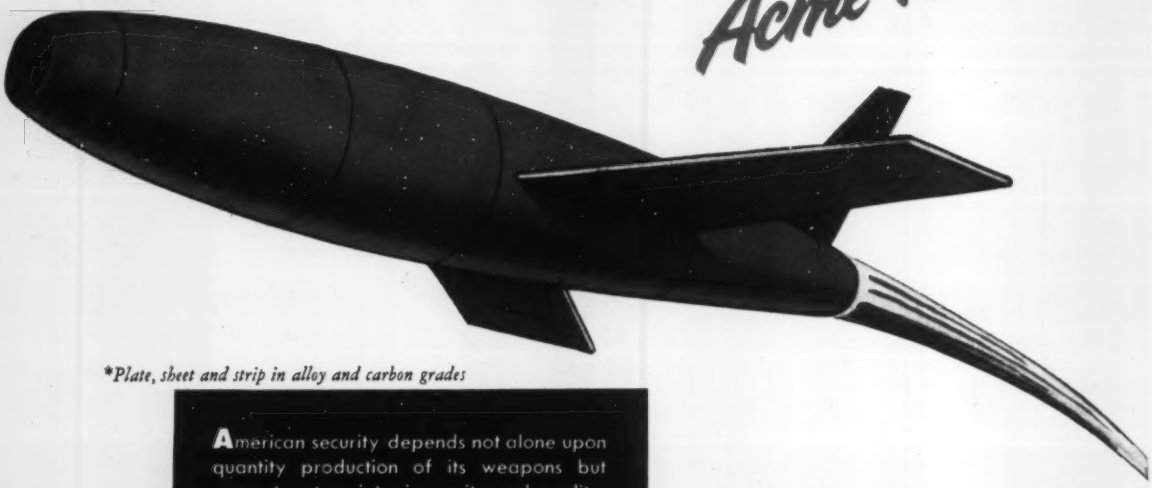
A New Look at the Nature of the Open-Hearth Process, B. M. Larsen, American Institute of Mining, Metallurgical & Petroleum Engineers, 29 W. 39th St., New York 18, N. Y. 47 pages, $3.

Here is an analysis of the process in relation to the factors that control speed and fuel efficiency. Treated quantitatively are rate of heat flow in the bath, rate of carbon oxidation and net heat requirement from fuel in relation to the amount of air oxidation from preheated or leakage air.

OUT OF THE SUBS AT SEA

FLY THE AIRCRAFT-QUALITY STEELS* OF . . .

Acme-Newport



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NEWPORT, KENTUCKY

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STEEL

April 1, 1957

Market Outlook

STEEL MILLS chalked up a good output in the first quarter. They produced steel for ingots and castings at an annual rate of 126.4 million net tons—considerably above predictions for the year.

At the start of the year, a common prediction was a record 120 million tons. Since then, some people have expressed belief that 120 million will not be reached.

FIRST QUARTER TALLY— The first quarter yield is 31,607,000 tons. This represents 94.7 per cent of capacity. A yearly output of 120 million tons would require an average operating rate of 90 per cent. So, operations can decline and we'll still come up with a 90 per cent rate. For example, a 90 per cent average for the year could come from the 94.7 per cent in the first quarter, 88 in the second, 84.3 in the third and 93 in the fourth.

BELOW THE RECORD— Production of 31,607,000 tons of steel for ingots and castings in the first quarter of this year was not a record. The record is the 32,441,558 tons produced in the fourth quarter of 1956. Output in the first quarter of 1956 was 31,872,014 tons.

March also fell slightly behind the year-ago performance. That month's production this year was 10,611,000 tons, compared with 10,924,788 tons last year.

AT 93 PER CENT— The final week of the first quarter saw STEEL's average of production at 93 per cent, a 1 point decline from that of the preceding week.

Increase in steel capacity has helped production catch up with demand at a time when demand has eased somewhat. In most cases, consumers are buying no more than their current usage requires, and some are living extensively off their inventories. The exceptions are users of heavy plates and structural shapes, particularly wide flanges—products for which demand has exceeded supply. But even here there is evidence of an easing.

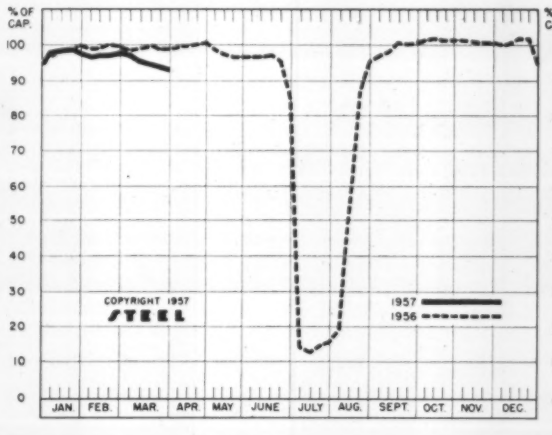
A CLUE— Producers which supply large amounts of steel to auto makers are not enthusiastic about the outlook for the early part of the second quarter. Strip mills apparently see little change in the pattern of automotive buying because they have made commitments to ship strip mill plates to fabricators for as far away as June. This has been a boon to makers of railroad freight cars.

A CHANGE— The easing in supply of steel is giving buyers an increased amount of leverage. Where they have placed orders for May and June deliveries, they are insisting that shipments be made ahead of expected midyear increases in steel prices.

SCRAP DECLINES— Slack demand for scrap and the prospect for reduced operating rates in the steel industry continue to lower the price of scrap. In the week ended Mar. 27, STEEL's price composite on steelmaking scrap fell to $47.67 a gross ton from the preceding week's $48.83. A year ago, the composite was $53.50.

Scrap prices, particularly those for No. 1 heavy melting, may strengthen along the coasts in response to the lifting of government restrictions on the export of this grade. Restrictions were imposed in late February.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended Mar. 31	Change	Same Week 1956	Same Week 1955
Pittsburgh	94	— 1.5*	103	97
Chicago	89	— 0.5*	97.5	95.5
Mid-Atlantic	95	— 2	98	94
Youngstown	91	— 5	94	96
Wheeling	79.5	—15.5	98	89.5
Cleveland	92	+ 2.5*	94	102
Buffalo	100	0	105	100
Birmingham	99	0	93	87.5
New England	65	— 2	86	70
Cincinnati	72	— 8*	93	88
St. Louis	99	— 3	100	95
Detroit	96	+ 4	102	90
Western	106	0	103	98
National Rate	93	— 1	98.5	95

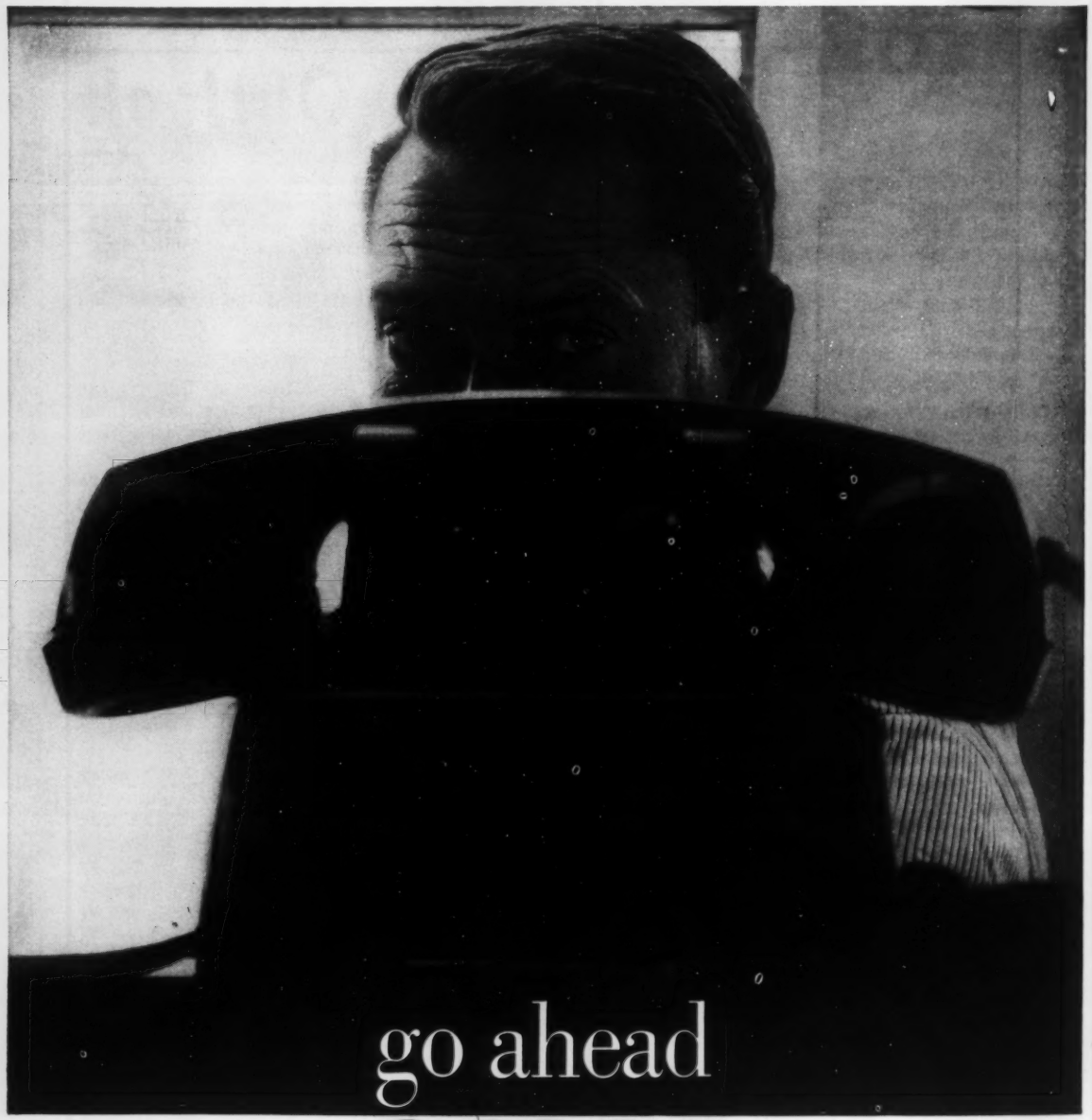
INGOT PRODUCTION‡

	Week Ended Mar. 31	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	146.5	148.9	152.9	152.6
NET TONS (In thousands)	2,354†	2,392	2,456	2,452

*Change from preceding week's revised rate. †Estimated. ‡American Iron & Steel Institute.

Weekly capacity (net tons): 2,559,490 in 1957; 2,461,893 in 1956; 2,413,278 in 1955.

Metalworking Outlook—p. 45



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It happens all the time. It can happen to *you*. "Sure," you say, "but just supposing"... OK. Let's look at the facts. In past years, we were saving 1 out of 4 cancer patients. Today, we're saving 1 in 3. And the odds could get better still . . . if *people would call their doctors in time!*

So go ahead...call. See your doctor now. And after your checkup—how about a check for the American Cancer Society? Every dollar sends us further along the road to cure. And when *that* happens . . . it's going to be a wonderful day for us all! Send your check to "Cancer" in care of your local Post Office.

Major Industrial Components

(Per cent of respondents)

Three months from now inventories will be:

	Higher	Lower	Same
Castings[1]	9 →	36 ←	55
Other formed components[2]	7 →	36 ←	57
Machined components[3]	7 →	31 ←	62
Fasteners	2 —	27 →	71
Electrical equipment & motors	10 —	23 →	67
Mechanical rubber goods & belting	8 →	26 ←	66

Legend: Arrows show trend since STEEL's last report.

[1]Die, gray iron, malleable, nonferrous, steel.
[2]Forgings, stampings, springs, wire shapes.
[3]Bearings, couplings, cylinders, gears, screw machine products.

Buyers Cut Inventories

Second quarter will see less buying of components as most companies reduce stock build-ups. Satisfactory deliveries encourage "wait and see" philosophy

BUYERS of major industrial components will cut inventories sharply in the second quarter. STEEL's latest quarterly survey reveals all categories (see table) will undergo a decided reduction during the next three months. Major reason: Buyers are becoming more cautious—see less need for maintaining large stock build-ups.

The component picture is just beginning to change, but look for stocks to start the downward spiral within a few weeks. Right now, about half the respondents are holding 30 to 60 day inventories. The other half are evenly split between 10 to 30 and 60 to 90 day supplies. Some 13 per cent say their inventories are higher than they were three months ago (see STEEL, Jan. 7, p. 485); 14 per cent report lower stocks; and 73 per cent say they are the same.

Outlook — Three months from now only 7 per cent of the respondents think inventories will be higher; 30 per cent say they will be lower; 63 per cent look for no change. This contrasts sharply with STEEL's last survey when 17 per cent expected inventories to go up, 14 per cent down and 69 per cent no change.

Only in fasteners and electrical equipment and motors is the trend not so pronounced. But there is a definite inclination toward inventory lowering in these categories.

Speed-Up — A decided shift in thinking is apparent. There seems to be a swing away from the philosophy that stocks must be bigger to do a bigger business. One reason could be that buyers have more confidence in suppliers filling their orders promptly. As one Cleveland manufacturer put it: "Delivery time has much to do with our reduction of inventories. This is reflected mostly in our purchases of steel components. A year ago we had to allow a 75-day lead time on orders; now it has been cut to 45 days."

Some firms say lower lead time will allow them to cut inventories as much as two-thirds.

Shortages—Only a few companies are having trouble with deliveries. Major slowdowns seem to be in antifriction bearings (9 per cent), and steel castings (7 per cent). Deliveries of malleable castings and forgings brought reports of trouble from 4 per cent of the respondents.

As protection against possible shortages, higher than desired inventories are reported in these areas: bearings, 6 per cent; gray iron castings, 4 per cent; springs and wire shapes, 4 per cent.

Sit and Wait—The reasons for inventory cutbacks are many and varied. One major factor is general business conditions. No manufacturer goes so far as to say the economy is headed into a slump, but most are content to sit back and "play it by ear."

"Inventories were built up before because of the difficulty in getting components," one midwest manufacturer reports. "Otherwise, we would have cut stocks back six months ago. Now we're just going to sit tight for awhile."

Factors—Two other factors encourage the trend: 1. The tie-up of working capital. 2. Taxes paid on inventory.

Says an appliance manufacturer: "Due to new management policies, inventories now must turn over six times a year instead of four. This releases capital needed for expansion and modernization. We also can't see paying personal property taxes on high inventory stores. It's better to keep them at a safe working minimum and save on taxes."

Some manufacturers see a buying upswing later in the year. But most firms seem to feel like the Great Lakes company which said: "As long as deliveries remain good, we see no reason to build up inventories."

Semifinished Steel . . .

Semifinished Prices, Page 143

The Cincinnati district steel ingot production rate is next to the lowest in the nation (see table on page 131). This low level results from Detroit Steel Corp.'s placement of its No. 1 open-hearth shop at Portsmouth, O., on a standby basis.

Production is being centered in the company's new and completely modern facility which has a capacity of 900,000 tons a year. This new shop has four 250 ton furnaces and one 275 ton furnace.

The No. 1 open hearth shop has ten 105 ton furnaces. Their total capacity is 600,000 tons a year.

Detroit Steel's management believes that the No. 2 shop, when operated at capacity, will be able to approximate the 1956 ingot production at considerably lower costs. The No. 1 open hearth shop, the management says, cannot be operated economically on an intermittent basis. Consequently, it has placed it on a standby basis until market or national emergency conditions warrant a sustained operation of at least four of the ten furnaces. These facilities will be maintained indefinitely in the interest of national defense, the company says.

Inasmuch as this capacity is still usable, it continues to be recognized in computation of STEEL's production rate for the Cincinnati district. Idleness of this capacity is reflected in a reduced operating rate for the district.

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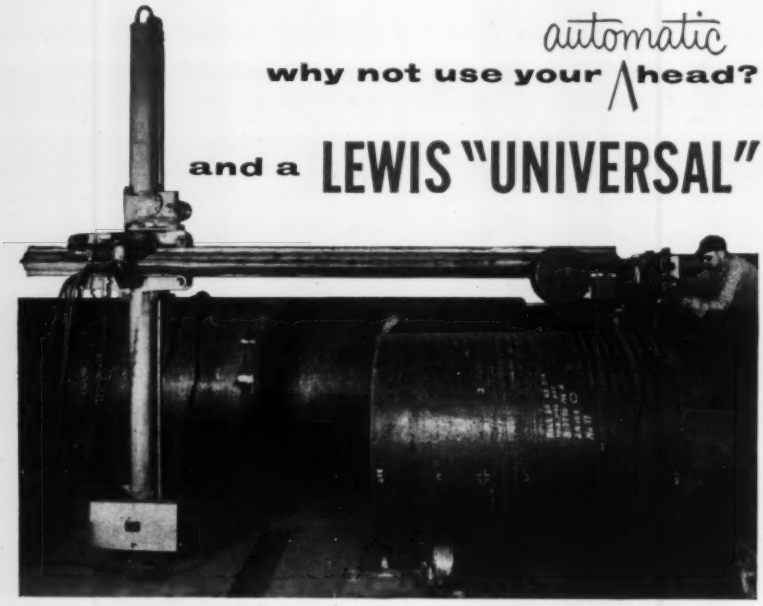
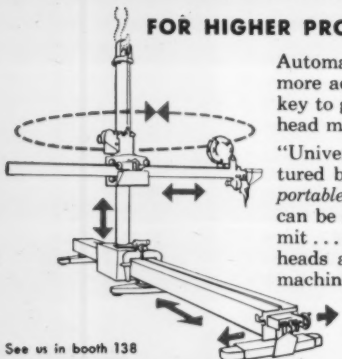


FOR HIGHER PROFITS WITH AUTOMATIC WELDING



Automatic welding cuts costs because it is faster, more accurate, more dependable. But . . . the real key to greater savings lies in the automatic welding head manipulator.

"Universal" manipulators, designed and manufactured by a weldment fabricator, are the only *fully portable and adjustable* machines of their type. They can be set-up quickly wherever crane facilities permit . . . position any automatic head rapidly . . . pilot heads at proper welding speeds . . . operate with machine tool accuracy.

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SPECIALISTS IN WELDMENT FABRICATION AND PRECISION WELDING EQUIPMENT

Refractories . . .

Refractories Prices, Page 149

Refractory prices advanced $3 to $20 per ton, effective Apr. 1, to reflect recent sharp cost increases, including wage adjustments and freight rates.

Fire clay brick is up $7 to $10 per 1000; silica brick, $10; high alumina brick, $15 to $20; magnesite, $3 a ton. No change on dolomite was announced.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 144 & 145

Sheetmakers detect a little improvement in demand for cold-rolled sheets. But the trend still is mixed. Pittsburgh sellers think the decline in demand is leveling out.

Recent cancellations of some tonnage by eastern auto body manufacturers for May and June depresses the market outlook in that area. But midwest sellers say automotive demand for May is somewhat better, though the improvement is nothing to get excited about. New England sellers anticipate a pickup in demand for May and June shipment tonnage.

It is figured that two of the big three auto makers are operating currently on three-week inventories, compared with what might be called a normal 30 to 45 days.

Light tank fabricators, steel drum makers and freight car builders are consuming heavy tonnages of hot-rolled sheets. Volume appears a little heavier than it has been of late. Manufacturers of stoves, office furniture and some lines of household appliances are operating fairly well. But they hold substantial steel stocks.

Steel Bars . . .

Bar Prices, Page 143

Hot carbon bars can be had within four to five weeks, in some cases within two to three weeks.

The situation for cold-finished bars is still easier. Some cold finishers are competing with jobbers for small lot business. Virtually prompt shipment is available on common sizes and grades. Most converters have good quantities of hot stock and a good assortment of processed material ready for sale.

Over recent weeks, some cold finishers have asked for deferments in shipments of hot stock. Fastener manufacturers also have been cutting down on deliveries from mills. Bar demand in general, however, is diversified and, on the average, is holding fairly well.

Plates . . .

Plate Prices, Page 143

Of all the major steel products, sheared plates continue in tightest supply. The increasing volume of strip-plate has resulted in a noticeable easing in supplies of light gage plates, and, to some extent, this easing is felt in the heavier gages, but plate over ½-in. continues hard to get.

Over-all demand still exceeds supply. Oil and gas and heavy industrial equipment requirements are holding up. Ship specifications are expanding, though Navy requirements may dip a little in the third quarter.

The larger volume of strip-plate available is proving a big help to the freight car builders.

Not much is heard about conversion tonnage of either plates or shapes.

Warehouse . . .

Warehouse Prices, Page 148

Following the usual seasonal pattern, March warehouse volume is expected to be the best to date this year at most marketing centers. Plates and shapes continue in strong demand everywhere, though pressure is not quite what it was now that strip-plate tonnage has taken some of the pinch out of the market.

Individual orders are said to be generally smaller than they were at this time a year ago. In general

The higher price recently quoted on cold-finished bars at Philadelphia by one jobber has failed to hold because the product is highly competitive.

Pig Iron . . .

Pig Iron Prices, Page 148

Blast furnace production totaled 6,658,106 net tons in February, reports the American Iron & Steel Institute. This was a decline from the 7,282,373 tons produced in January, but was up slightly from the 6,602,817-ton figure for February, 1956.

Production during the month was: Pig iron, 6,596,133 tons; ferromanganese and spiegeleisen, 61,973 tons. This compares with 6,539,199 tons of pig iron and 63,618 tons of ferroalloys in February a year ago.

Output of the furnaces in the first two months this year (pig iron and ferroalloys combined) was 13,940,449 tons, representing 99.3 per cent of capacity. This

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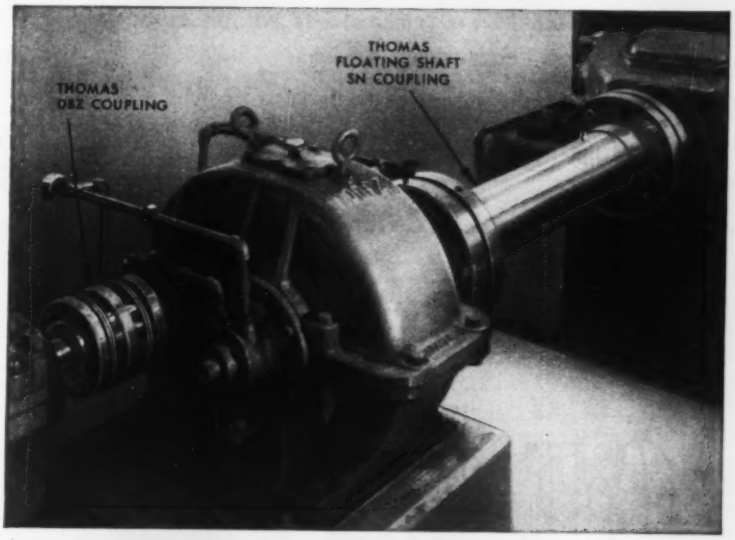

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The A. B. Dick Company, Niles, Illinois, found that this C-F Lifter has substantially reduced man hours and crane time required to move stock in and out of storage.

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1308 South Kilbourn Avenue • Chicago 23, Illinois

compares with 13,652,381 tons, 97.1 per cent of capacity, in the like period of 1956. Iron output in the first two months this year was 13,805,650 tons; ferroalloys, 134,799 tons. In the like period last year, iron output was 13,525,-144 tons, ferroalloys, 127,237 tons.

Mystic Iron Works, Everett, Mass., has boosted its base prices $1.50 on pig iron for second quarter delivery. The advance was less than had been expected and is based on higher costs in the first quarter. Most New England casting shops are affected through contracts with Mystic.

Wire . . .

Wire Prices, Pages 145 & 146

Base price increases have been effected on a number of wire products over the last couple weeks. Some items, such as tire bead wire, are up $10 a ton. Rope wire is up $9. These advances are in addition to higher extras recently put into effect.

April wire mill schedules are thin in New England with only spotty improvement in demand noted for May shipment.

Some seasonal pickup in the merchants product trade is noted, but volume continues disappointing. Manufacturers wire demand continues sluggish.

Tubular Goods . . .

Tubular Goods Prices, Page 147

Specialty producers are receiving good orders for mechanical tubing (April delivery) and pressure tubing (second quarter delivery). The utility buyers require heavy tonnages of pressure tubing. Demand for mechanical tubing may decline in May and June because orders for those months are coming in slowly. Automotive buying is slack, and the warehouses are still trimming their intake.

An oil country goods producer at Pittsburgh is receiving substantial tonnage orders for third quarter shipment. Second quarter production will be at capacity.

Iron Ore . . .

Iron Ore Prices, Page 149

Receipts of iron ore in January totaled 3,564,479 gross tons, reports the Lake Superior Iron Ore Association. Of the total, 186,965

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Imagine a device that can equal the work of thousands of skilled men. Impossible? Perhaps it is, but industrial advertising—your "star contact man"—may easily make as many calls as 10,000 flesh and blood salesmen—or more.

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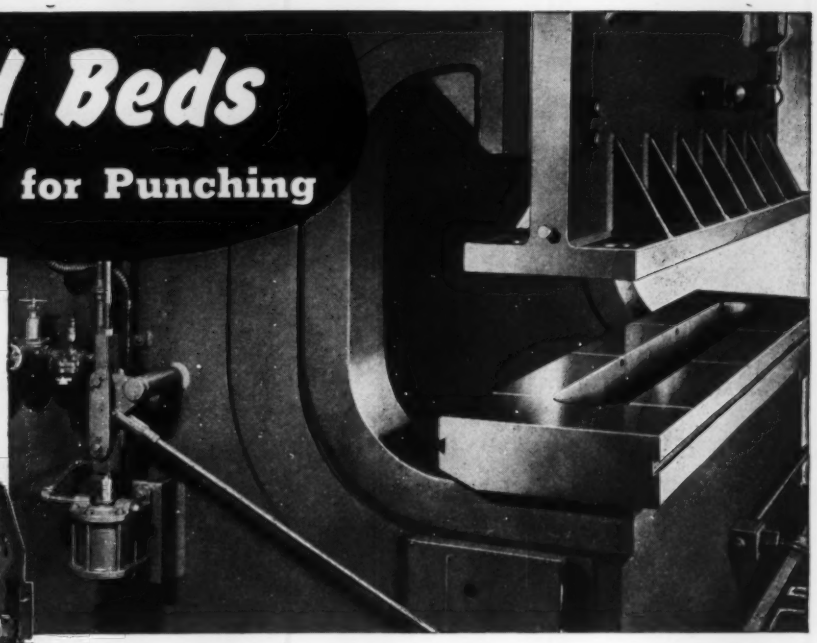
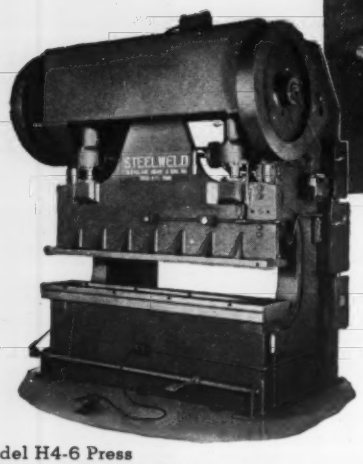
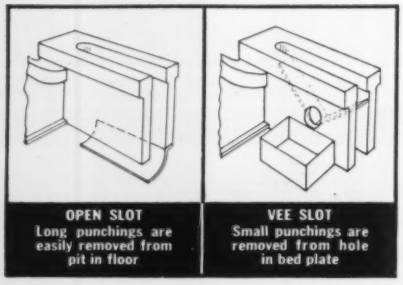
An organization of over 4000 members engaged in the advertising and marketing of industrial products, with local chapters in ALBANY, BALTIMORE, BOSTON, BUFFALO, CHICAGO, CLEVELAND, COLUMBUS, DALLAS-FORT WORTH, DENVER, DETROIT, HAMILTON, ONT., HARTFORD, HOUSTON, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, MINNEAPOLIS-ST. PAUL, MONTREAL, QUE., NEWARK, NEW YORK, PHILADELPHIA, PITTSBURGH, PORTLAND, ROCHESTER, ROCKFORD, ST. LOUIS, SAN FRANCISCO, TORONTO, ONT., YOUNGSTOWN.

Slotted Beds
for Punching





Model H4-6 Press with slotted bed. Handles plate to 6′ 0″ long between end housings. Operated by foot treadle or air-electric control.



OPEN SLOT
Long punchings are easily removed from pit in floor

VEE SLOT
Small punchings are removed from hole in bed plate

Converts Bending Press to Punch Press... and Cuts Costs as Much as 1/2

Because Steelweld Presses adapted for punching often cost as little as one-half that of ordinary punch presses a number of companies have purchased them and effected real savings.

Double-plate beds are usually employed with extra wide bed and ram to support the dies. In other respects the presses are standard. Machines have been built with beds as wide as 36″, with slots in bed varying from 3″ to 6¾″ wide. The punchings drop between the bed plates (See sketches) and are easily removed from behind the machine.

The same presses used for punching can be used for bending and other forming operations. Steelweld Presses are standardized in all lengths to 20′-0″ and in various capacities to 750 tons. Larger sizes and capacities on request.

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STEELWELD
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tons were U.S. Lake Superior ores; 1,715,152 other U.S. ores; 53,015 Canadian Lake Superior ores; 85,446 tons, other Canadian ores; 1,523,901 tons, foreign ores (other than Canadian).

Consumption during the month was 12,044,948 tons. It ran this way: U.S. Lake Superior ores, 7,509,583 tons; other U.S. ores, 1,630,662 tons; Canadian Lake Superior ores, 382,021; other Canadian, 815,817; foreign ores (except Canadian) 1,706,865 tons.

Stocks of ore on hand at docks and furnaces on the last day of January totaled 49,334,675 tons. Break down: U.S. Lake Superior ores, 35,754,857 tons; other U.S. ores, 3,122,897; Canadian Lake Superior ores, 1,729,237; other Canadian, 4,290,268; foreign ores (other than Canadian), 4,437,416 tons.

Active blast furnaces on the last day of January numbered 246 in the U.S. and 13 in Canada, or 259 out of a total of 273 stacks.

Structural Shapes . . .

Structural Shape Prices, Page 143

Aside from bridge work, structural steel demand is spotty in the East. Commercial construction is light, and industrial building is moving ahead at a somewhat slower pace. Various projects are on the drawing boards and could proceed promptly once builders decide that conditions are right to go ahead.

The volume of fabricated steel being estimated in New England is reduced by the lag in bridge tonnage in that area.

Fabricators are in need of wide flange sections, but bar shapes and smaller standard structurals are in improved supply. Mills are meeting delivery schedules better.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 143

Fairly strong demand for reinforcing steel is anticipated on the Pacific Coast over the coming months. Highway construction is expected to provide a substantial market throughout the spring and summer.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2350 tons, transmission tower steel, to the Bethlehem Pacific Coast Steel Corp., Seattle, by the Bonneville Power Administration, Portland, Oreg.

1100 tons, court house, Mobile, Ala., to the Connors Steel Division, H. K. Porter Company Inc., Birmingham; Daniel Construction Co., Birmingham, general contractor.

1325 tons, mill building, Babcock & Wilcox Co., Barberton, O., to the A. O. Wilson Structural Co., Cambridge, Mass., through the Gilbane Building Corp., Providence, R. I.

570 tons, high school, Shrewsbury, Mass., to the A. O. Wilson Structural Co., Cambridge, Mass., through John Copabianco Co., Boston, general contractor.

545 tons, high school, San Antonio, Tex., to Campbell Steel Co., San Antonio; F. L. Scott & Son, San Antonio, general contractor.

930 tons, armory-field house, University of Tennessee, Knoxville, Tenn., to Tucker Steel Corp., Knoxville; V. L. Nicholson Co., Knoxville, general contractor.

725 tons, aircraft shelters, Truax AFB, Madison, Wis., to the Capitol Steel & Iron Co., Oklahoma City, Okla.

355 tons, high school, San Antonio, Tex., to the Campbell Steel Co., San Antonio; F. L. Scott & Son, San Antonio, general contractor.

400 tons, power house, Armco Steel Corp., Ashland, Ky., to the Mississippi Valley Structural Steel Co., St. Louis.

290 tons, junior-senior high school, Amarillo, Tex., to the Capitol Steel & Iron Co., Oklahoma City, Okla.; Neill Singleton, Amarillo, general contractor.

270 tons, bridge, relocation over US-12, near Jackson, Mich., to the Bethlehem Steel Co., Bethlehem, Pa.

180 tons, building addition, National Institute of Health, Bethesda, Md., to Adams Fabricating Steel Co., Washington; John A. Volpe Construction Co., Washington, general contractor.

180 tons, two-span rolled beam bridge, to the Bethlehem Steel Co., Bethlehem, Pa.; Frouge Construction Co. Inc., and D'Addario Construction Co., Bridgeport, Conn., joint general contractors.

STRUCTURAL STEEL PENDING

5600 tons, bridge, Summit, Del., for U.S. Army Engineers, Philadelphia; American Bridge Division, U.S. Steel Corp., Pittsburgh, is low bidder.

2000 tons, Mt. Tom steam station power plant, Holyoke Water Co., Holyoke, Mass.; bids in.

2000 tons, state bridge, sec. 2, Montgomery county, Pa.; F. A. Canuso & Son, Philadelphia, is low on the general contract; 1000 tons of reinforcing bars also required.

1400 tons, state bridge, sec. 3, Montgomery county, Pa.; James Morrissey & Co. is low on the general contract; 700 tons of reinforcing bars also required.

1000 tons, exhibition hall, Miami Beach, Fla.; bids in direct, city manager, Mar. 29.

500 tons or more, two additional contracts, railroad relocation, Noxon Rapids dam, Montana; general contracts to Hansen & Parr and James Crick & Sons, Spokane, by the Washington Water Power Co., Spokane.

145 tons, two composite rolled beam bridges.

500 tons or more, two 250-ton, traveling cranes for Rocky Reach power house; Moffett Engineering Co. Inc., Albany, Calif., apparently low at $442,642.

300 tons, composite rolled beam bridge, Naugatuck river, Torrington, Conn.; bids Apr. 1, Hartford, Conn.; also 75 tons of reinforcing bars.

REINFORCING BARS . . .

REINFORCING BARS PLACED

331 tons, Washington state, Thurston county, highway bridges to the Bethlehem Pacific Coast Steel Corp., Seattle; T. T. Burnham, Seattle, general contractor.

200 tons, public health building, University of Massachusetts, Amherst, Mass., to the Concrete Steel Co., Boston; O. D. Purrington Co. Inc., Providence, R. I., general contractor.

190 tons, early warning installation, Driftwood Bay, Alaska, to the Northwest Steel Rolling Mills Inc., Seattle; Patti-McDonald Co., general contractor.

REINFORCING BARS PENDING

2850 tons, structures and highways, contracts

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GENERAL REFRACTORIES

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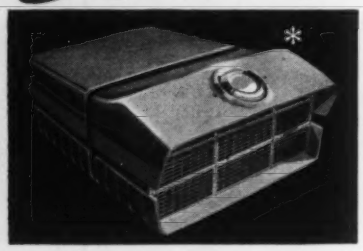

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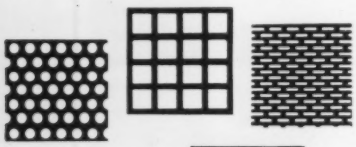
*Product Development by William M. Schmidt Associates



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☐ STOCK LIST of Perforated Steel Sheets

NAME_____

TITLE_____

COMPANY_____

STREET_____

CITY_____ ZONE_____ STATE_____

T-4A and E-IA Cook and Kane counties, Illinois; bids Apr. 11, Illinois State Toll Highway Commission, Chicago.

405 tons, Eagle gorge dam; bids to U.S. Engineer, Seattle, May 2.

400 tons or more, four Nike installations, Elelson Air Base, Alaska; Peter Kiewit Sons Co., Seattle, low at $11,953,067.

150 tons, also side gates and 48-in. concrete siphon, Howard Prairie, Rouge river project; rebids to the Bureau of Reclamation, Medford, Oreg., Apr. 25.

135 tons, Washington state highway span, Thurston county; bids to Olympia, Wash., Apr. 2.

115 tons, Washington state highway span, Whatcom county; bids to Olympia, Wash., Mar. 26.

110 tons, bridge, Mississippi National Forest, Sharkey county, Miss.; bids Apr. 19, Bureau of Public Roads, Florence, Ala.; also 75 tons of structural steel.

PLATES . . .

PLATES PLACED

225 tons, 600,000-gal elevated water tank, Veterans Hospital, Roanoke, Va., to the Pittsburgh-Des Moines Steel Co., Pittsburgh.

PLATES PENDING

500 tons, estimated, 3-million-gal steel reservoir, and 150,000-gal elevated tank, Colorado river storage project, near Lee's Ferry, Ariz.; bids Apr. 11, Department of the Interior, Kanak, Utah.

305 tons, steel tunnel lining, Foothills Parkway, Tennessee; bids Mar. 21, Bureau of Public Roads, Gatlinburg, Tenn.; also 90 tons, reinforcing bars.

275 tons, ⅜-in. plate liner, Eagle gorge flood project; bids to the U.S. Engineer, Seattle, about May 2.

250 tons, three steel barges for crawler draglines; bids Mar. 24, Corps of Engineers, St. Louis.

180 tons, three 84-in. ring-follower gates, Trinity dam, Central Valley project, California.

175 tons, carbon, Raritan Arsenal, Metuchen, N. J.; bids Mar. 11.

125 tons, 10,000-bbl fuel storage tank, Columbus, Miss., AFB; bids Mar. 14, Corps of Engineers, Mobile, Ala.

125 tons, coaster gate, Grand Coulee dam, Columbia Basin project, Washington.

PIPE . . .

CAST IRON PIPE PENDING

155 tons, Wenatchee, Wash.; Pacific States Cast Iron Pipe Co., Seattle, low.

103 tons, for Centralia and Auburn, Wash.; Pacific States Cast Iron Pipe Co., Seattle, low.

RAILS, CARS . . .

RAILROAD CARS PLACED

North American Car Corp., 200 seventy-ton covered hopper cars, placed; 125 going to Pullman-Standard Car Mfg. Co., Chicago, and 75 to ACF Industries Inc., New York.

Gulf, Mobile & Ohio, 50 seventy-ton mill type gondolas to the Bethlehem Steel Co., Bethlehem, Pa., and ten 19,000-gallon tank cars to ACF Industries Inc., New York.

Norfolk Southern, 25 fifty-ton hoppers, to Bethlehem Steel Co., Bethlehem, Pa.

Union Pacific, 500 seventy-ton gondolas, to Bethlehem Steel Co., Bethlehem, Pa.

Wabash, four 70-ton covered hopper cars, to Pullman-Standard Car Mfg. Co., Chicago.

South Puerto Rico Sugar Co., 160 thirty-ton cane cars, to Magor Car Corp., New York; this builder also booked 110 boxcars, 25 gondola cars, 15 stock cars, 10 flatcars, 10 tank cars and 5 special boxcars for a road in Venezuela.

Chicago, Burlington & Quincy, ten air conditioned gallery cars, to Budd Co., Philadelphia.

RAILROAD CARS PENDING

Southern Railways, 2600 miscellaneous freight cars, bids asked; list comprises 1200 seventy-ton gondolas, 500 seventy-ton triple hoppers, 400 seventy-ton cement hoppers, 200 covered hoppers, 200 fifty-ton boxcars and 100 seventy-ton drop-end gondolas.

Cotton Belt, 100 covered hopper cars and 50 pulp wood rack cars, contemplated.

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Max-Lift Crane Hook Block

● You get higher lifting limits, greater versatility for mobile cranes and other industrial equipment with the U-W Max-Lift Crane Hook Block.

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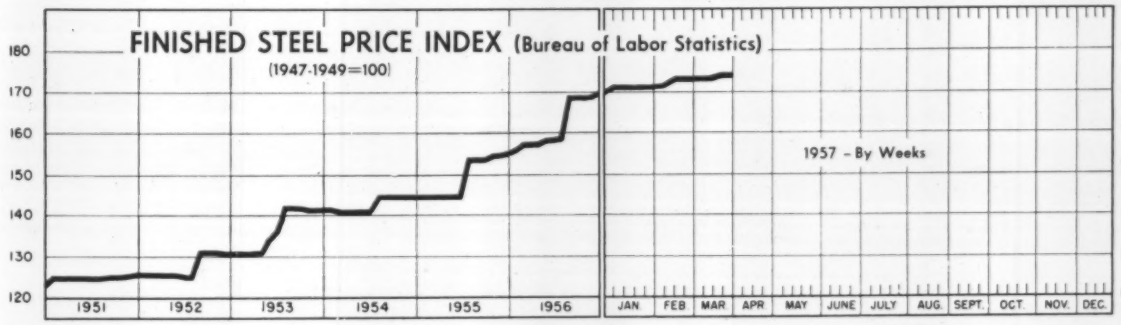
Price Indexes and Composites



Mar. 26, 1957	Week Ago	Month Ago	Mar. Avg.	Year Ago
174.0	174.0	173.8	173.9	157.1

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Mar. 26

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$5.350	Bars, Reinforcing	5.788
Rails, Light, 40 lb	6.817	Bars, C.F., Carbon	9.910
Tie Plates	6.275	Bars, C.F., Alloy	13.450
Axles, Railway	9.400	Bars, C.F., Stainless, 302 (lb)	0.533
Wheels, Freight Car, 33 in. (per wheel)	57.50	Sheets, H.R., Carbon	5.945
Plates, Carbon	5.900	Sheets, C.R., Carbon	6.789
Structural Shapes	5.667	Sheets, Galvanized	8.220
Bars, Tool Steel, Carbon (lb)	0.480	Sheets, C.R., Stainless, 302 (lb)	0.660
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.585	Sheets, Electrical	11.225
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274	Strip, C.R., Carbon	8.843
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.769	Strip, C.R., Stainless, 430 (lb)	0.475
Bars, H.R., Alloy	10.150	Strip, H.R., Carbon	6.000
Bars, H.R., Stainless, 303 (lb)	0.508	Pipe, Black, Buttweld (100 ft)	18.894
Bars, H.R., Carbon	6.075	Pipe, Galv, Buttweld (100 ft)	23.034
		Pipe, Line (100 ft)	190.108
		Casing, Oil Well, Carbon (100 ft)	185.566
		Casing, Oil Well, Alloy (100 ft)	288.980
		Tubes, Boiler (100 ft)	46.737
		Tubing, Mechanical, Carbon (100 ft)	23.713
		Tubing, Mechanical, Stainless, 304 (100 ft)	197.663
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	9.433
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.133
		Black Plate, Canmaking Quality (95 lb base box)	7.233
		Wire, Drawn, Carbon	9.775
		Wire, Drawn, Stainless, 430 (lb)	0.630
		Bale Ties (bundle)	7.213
		Nails, Wire, 8d Common	9.365
		Wire, Barbed (80-rod spool)	8.412
		Woven Wire Fence (20-rod roll)	20.565

STEEL's FINISHED STEEL PRICE INDEX*

	Mar. 27 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg.=100)	227.41	227.41	227.10	209.10	171.92
Index in cents per lb	6.161	6.161	6.152	5.665	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel NT*	$139.71	$139.71†	$139.60	$128.02	$106.32
No. 2 Fdry Pig Iron, GT	64.70	64.70†	62.63	59.42	52.54
Basic Pig Iron, GT	64.23	64.23†	62.18	58.93	52.16
Malleable Pig Iron, GT	65.77	65.77†	63.41	60.55	53.27
Steelmaking Scrap, GT	47.67	48.83	52.50	53.50	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130. †Revised.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	1957 Mar. 27	Ago Week	Ago Month	Ago Year	Ago 5 Yr
Bars, H.R., Pittsburgh	5.075	5.075	5.075	4.65	3.70
Bars, H.R., Chicago	5.075	5.075	5.075	4.65	3.70
Bars, H.R., deld., Philadelphia	5.365	5.365	5.365	4.93	4.223
Bars, C.F., Pittsburgh	6.85*	6.85*	6.85*	6.25*	4.55
Shapes, Std., Pittsburgh	5.00	5.00	5.00	4.60	3.65
Shapes, Std., Chicago	5.00	5.00	5.00	4.60	3.65
Shapes, deld., Philadelphia	5.31	5.31	5.31	5.00	3.918
Plates, Pittsburgh	4.85	4.85	4.85	4.50	3.70
Plates, Chicago	4.85	4.85	4.85	4.50	3.70
Plates, Coatesville, Pa.	5.25	5.25	5.25	4.80	4.15
Plates, Sparrows Point, Md.	4.85	4.85	4.85	4.50	3.70
Plates, Claymont, Del.	5.70	5.70	5.70	4.80	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.60-3.75
Sheets, H.R., Chicago	4.675	4.675	4.675	4.325	3.60
Sheets, C.R., Pittsburgh	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Detroit	5.75-5.85	5.75-5.85	5.75-5.85	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.30	6.30	6.30	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.675	4.325	3.50
Strip, C.R., Pittsburgh	6.85	6.85	6.85	6.25	4.65-5.35
Strip, C.R., Chicago	6.85	6.85	6.85	6.25-6.35	4.90
Strip, C.R., Detroit	6.95	6.95	6.95	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.20	7.20	7.20	6.60	4.85-5.10
Nails, Wire, Pittsburgh	8.49	8.49	8.49	7.60	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.95	$9.95	$9.95	$9.45	$8.70

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$91.50	$91.50	$91.50	$84.50	$66.00
Wire rods, 7/32-5/8" Pitts.	5.80	5.80	5.80	5.375	4.10-4.30

PIG IRON, Gross Ton

	Mar. 27 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$65.50	$65.50	$63.50	$61.00	$53.00
Basic, Valley	64.50	64.50	62.50	58.50	52.00
Basic, deld., Phila.	68.38	68.38	66.26	63.76	56.61
No. 2 Fdry, NevilleIsland,Pa.	65.00	65.00	63.00	60.50	52.50
No. 2 Fdry, Chicago	65.00	65.00	63.00	60.50	52.50
No. 2 Fdry, deld., Phila.	68.88	68.88	66.76	64.26	57.11
No. 2 Fdry, Birm.	59.00	59.00	59.00	62.70	48.88
No. 2 Fdry(Birm.)deld. Cin.	66.70	66.70	66.70	62.70	55.49
Malleable, Valley	65.00	65.00	63.00	59.00	52.50
Malleable, Chicago	65.00	65.00	63.00	60.50	52.50
Ferromanganese, Duquesne	255.00†	255.00†	255.00†	205.00†	188.00*

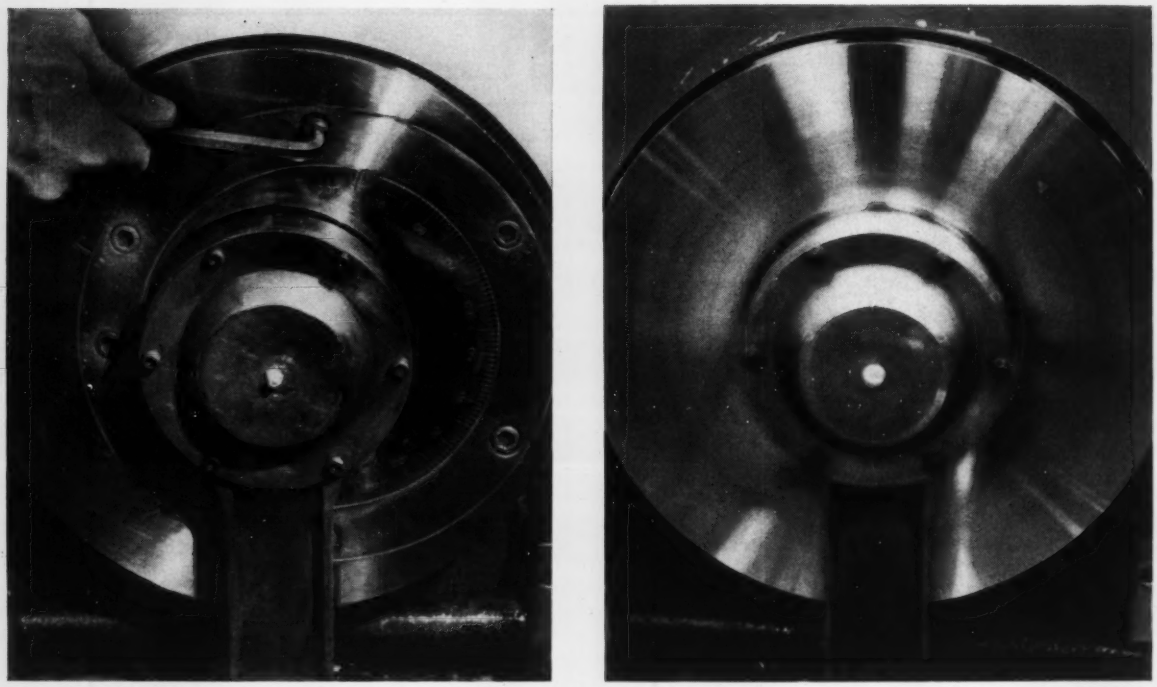
†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$46.50	$50.50	$53.50	$49.00	$44.00
No. 1 Heavy Melt, E. Pa.	52.00	54.00	57.00	51.00	42.50
No. 1 Heavy Melt, Chicago	44.50	45.00	47.50	53.50	42.50
No. 1 Heavy Melt, Valley	44.50	46.50	52.50	57.50	44.00
No. 1 Heavy Melt, Cleve.	41.50	43.50	50.50	54.50	43.00
No. 1 Heavy Melt, Buffalo	48.50	48.50	53.50	50.50	43.00
Rails, Rerolling, Chicago	59.50	59.50	63.50	72.50	52.50
No. 1 Cast, Chicago	41.50	42.50	45.50	48.50	49.00

COKE, Net Ton

Beehive, Furn, Connlsvl.	$15.25	$15.25	$15.25	$14.125	$14.75
Beehive, Fdry, Connlsvl.	18.00	18.00	18.00	16.50	17.50



Self-locking UNBRAKO socket screws keep critical adjustments secure in the eccentric drive mechanism of this fatigue testing machine. Drive system delivers varying loads up to 15,000 pounds force to equipment under test at 1050 cycles per minute.

Vibration won't loosen Self-locking UNBRAKO socket cap screws

Screws with Nylok* device permit adjustments, keep precise settings during long test runs

HOW IT LOCKS. The tough, resilient Nylok locking pellet keys itself into the mating threads. It forces threads together, and locks the screw securely—whether or not the screw is seated.

UNBRAKO socket screws with the Nylok self-locking device stay tight under constant vibration.

Take the eccentric drive system in the fatigue testing machine illustrated above, for example. This machine must frequently run for periods up to 2 weeks or longer, day and night, to complete a single test. Loosening of the screws which are used to adjust the tension-setting mechanism could not only cause damage to the machine, but also make the test data worthless. Self-locking UNBRAKO socket head cap screws eliminate such problems.

An UNBRAKO socket screw with the Nylok self-locking device is a single unit. Just screw it into any tapped hole. Seated or not, it locks positively wherever wrenching stops. Constant vibration or pounding, or endless running of a machine, won't affect these self-locking UNBRAKOs. The screws will not work loose!

Write today for your copy of Form 2193, which gives complete catalog and technical data on the entire line of UNBRAKO socket screws with the Nylok self-locking device. Or see your authorized industrial distributor. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 33, Pa.

UNBRAKO SOCKET SCREW DIVISION

STANDARD PRESSED STEEL CO.

SPS

JENKINTOWN PENNSYLVANIA

*T.M. Reg. U.S. Pat. Off. The Nylok Corporation

Steel Prices

Mill prices as reported to STEEL, Mar. 27, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 144; to footnotes, page 146.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 ..... $70.50

INGOTS, Alloy (NT)

Detroit R7 ..... $74.00
Houston S5 ..... 74.00
Midland,Pa. C18 ..... 74.00
Munhall,Pa. U5 ..... 74.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Bessemer,Pa. U5 ..... $74.00
Bridgeport,Conn. N19 .. 79.00
Buffalo R2 ..... 74.00
Clairton,Pa. U5 ..... 74.00
Ensley,Ala. T2 ..... 74.00
Fairfield,Ala. T2 ..... 74.00
Fontana,Calif. K1 ..... 83.50
Gary,Ind. U5 ..... 74.00
Johnstown,Pa. B2 ..... 74.00
Lackawanna,N.Y. B2 .. 74.00
LoneStar,Tex. L6 ..... 80.00
Munhall,Pa. U5 ..... 74.00
S.Chicago,Ill. R2, U5.. 74.00
S.Duquesne,Pa. U5 ..... 74.00
Sterling, Ill. N15 ..... 74.00
Youngstown R2 ..... 74.00

Carbon, Forging (NT)

Bessemer,Pa. U5 ..... $91.50
Bridgeport,Conn. N19 .. 96.50
Buffalo R2 ..... 91.50
Canton,O. R2 ..... 94.00
Clairton,Pa. U5 ..... 91.50
Conshohocken,Pa. A3 .. 96.50
Ensley,Ala. T2 ..... 91.50
Fairfield,Ala. T2 ..... 91.50
Fontana,Calif. K1 ..... 101.00
Gary,Ind. U5 ..... 91.50
Geneva,Utah C11 ..... 91.50
Houston S5 ..... 96.50
Johnstown,Pa. B2 ..... 91.50
Lackawanna,N.Y. B2 .. 91.50
LosAngeles B3 ..... 101.00
Midland,Pa. C18 ..... 91.50
Munhall,Pa. U5 ..... 91.50
Seattle B3 ..... 105.00
S.Chicago R2, U5, W14 91.50
S.Duquesne,Pa. U5 ..... 91.50
S.SanFrancisco B3 ..... 101.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 .. $107.00
Bridgeport,Conn. N19 .. 107.00
Buffalo R2 ..... 107.00
Canton,O. R2 ..... 107.00
Conshohocken,Pa. A3 .. 114.00
Detroit R7 ..... 107.00
Fontana,Calif. K1 ..... 128.00
Gary,Ind. U5 ..... 107.00
Houston S5 ..... 112.00
Ind.Harbor,Ind. Y1 .. 107.00
Johnstown,Pa. B2 ..... 107.00
Lackawanna,N.Y. B2 .. 107.00
LosAngeles B3 ..... 127.00
Massillon,O. R2 ..... 107.00
Midland,Pa. C18 ..... 107.00
Munhall,Pa. U5 ..... 107.00
S.Chicago R2,U5,W14 .. 107.00
S.Duquesne,Pa. U5 .. 107.00
Struthers,O. Y1 ..... 107.00
Warren,O. C17 ..... 107.00

ROUNDS, SEAMLESS TUBE (NT)

Bridgeport,Conn. N19 $116.50
Buffalo R2 ..... 111.50
Canton,O. R2 ..... 114.00
Cleveland,O. R2 ..... 111.50
Gary,Ind. U5 ..... 111.50
S.Chicago,Ill. R2, W14 .. 111.50
S.Duquesne,Pa. U5 .. 111.50

SKELP

Aliquippa,Pa. J5 ..... 4.725
LoneStar,Tex. L6 ..... 5.025
Munhall,Pa. U5 ..... 4.625
Warren,O. R2 ..... 4.625
Youngstown R2, U5 .. 4.625

WIRE RODS

AlabamaCity,Ala. R2 .. 5.80
Aliquippa,Pa. J5 ..... 5.80
Alton,Ill. L1 ..... 6.00
Buffalo W12 ..... 5.80
Cleveland A7 ..... 5.80
Donora,Pa. A7 ..... 5.80
Fairfield,Ala. T2 ..... 5.80
Houston S5 ..... 6.05
IndianaHarbor,Ind. Y1.. 5.80
Johnstown,Pa. B2 ..... 5.80
Joliet,Ill. A7 ..... 5.80
KansasCity,Mo. S5 .... 6.05
Kokomo,Ind. C16 ..... 5.90
LosAngeles B3 ..... 6.60
Minnequa,Colo. C10 .... 6.05
Monessen,Pa. P17 ..... 5.80
N.Tonawanda,N.Y. B11 .. 5.80
Pittsburg,Calif. C11 .... 6.60
Portsmouth,O. P12 .... 5.80
Roebling,N.J. R5 ..... 5.90
S.Chicago,Ill. R2 ..... 5.80
SparrowsPoint,Md. B2 .. 5.90
Sterling,Ill.(1) N15 .. 5.80
Sterling,Ill. N15 ..... 5.90
Struthers,O. Y1 ..... 5.80
Worcester,Mass. A7 .... 6.10

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 ..... 5.00
Aliquippa,Pa. J5 ..... 5.00
Bessemer,Ala. T2 ..... 5.00
Bethlehem,Pa. B2 ..... 5.05
Birmingham C15 ..... 5.25
Clairton,Pa. U5 ..... 5.00
Fairfield,Ala. T2 ..... 5.00
Fontana,Calif. K1 ..... 5.75
Gary,Ind. U5 ..... 5.00
Geneva,Utah C11 ..... 5.00
Houston S5 ..... 5.10
Ind.Harbor,Ind. I-2 .... 5.00
Johnstown,Pa. B2 ..... 5.05
Joliet,Ill. P22 ..... 5.00
KansasCity,Mo. S5 .... 5.10
Lackawanna,N.Y. B2 .. 5.05
LosAngeles B3 ..... 5.70
Minnequa,Colo. C10 .... 5.30
Munhall,Pa. U5 ..... 5.00
Niles,Calif. P1 ..... 5.75
Phoenixville,Pa. P4 .... 5.85
Portland,Oreg. O4 .... 5.80
Seattle B3 ..... 5.75
S.Chicago,Ill. U5, W14.. 5.00
S.SanFrancisco B3 .... 5.65
Sterling,Ill. N15 ..... 5.00
Torrance,Calif. C11 .... 5.70
Weirton,W.Va. W6 .... 5.00

Wide Flange

Bethlehem,Pa. B2 ..... 5.05
Clairton,Pa. U5 ..... 5.00
Fontana,Calif. K1 ..... 5.90
IndianaHarbor,Ind. I-2 .. 5.25
Lackawanna,N.Y. B2 .. 5.05
Munhall,Pa. U5 ..... 5.00
Phoenixville,Pa. P4 .... 5.85
S.Chicago,Ill. U5 ..... 5.00

Alloy Std. Shapes

Aliquippa,Pa. J5 ..... 6.20
Clairton,Pa. U5 ..... 6.20
Gary,Ind. U5 ..... 6.20
Houston S5 ..... 6.30
Munhall,Pa. U5 ..... 6.20
S.Chicago,Ill. U5 ..... 6.20

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 ..... 7.35
Bessemer,Ala. T2 ..... 7.35
Bethlehem,Pa. B2 ..... 7.40
Clairton,Pa. U5 ..... 7.35
Fairfield,Ala. T2 ..... 7.35
Fontana,Calif. K1 ..... 8.10
Gary,Ind. U5 ..... 7.35
Geneva,Utah C11 ..... 7.35
Houston S5 ..... 7.45
Ind.Harbor,Ind. I-2, Y1.. 7.35
Johnstown,Pa. B2 ..... 7.40
KansasCity,Mo. S5 .... 7.45
Lackawanna,N.Y. B2 .. 7.40
LosAngeles B3 ..... 8.05
Munhall,Pa. U5 ..... 7.35
Seattle B3 ..... 8.10
S.Chicago,Ill. U5, W14.. 7.35
S.SanFrancisco B3 .... 8.00
Struthers,O. Y1 ..... 7.35

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 ..... 7.40
Lackawanna,N.Y. B2 .. 7.40
Munhall,Pa. U5 ..... 7.35
S.Chicago,Ill. U5 ..... 7.35

PILING

BEARING PILES

Bethlehem,Pa. B2 ..... 5.05
Lackawanna,N.Y. B2 .. 5.05
Munhall,Pa. U5 ..... 5.00
S.Chicago,Ill. U5 ..... 5.00

STEEL SHEET PILING

Lackawanna,N.Y. B2 .. 5.90
Munhall,Pa. U5 ..... 5.90
S.Chicago,Ill. U5 ..... 5.90

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 ..... 4.85
Aliquippa,Pa. J5 ..... 4.85
Ashland,Ky.(15) A10 .. 4.85
Bessemer,Ala. T2 ..... 4.85
Clairton,Pa. U5 ..... 4.85
Claymont,Del. C22 .... 5.70
Cleveland J5, R2 ..... 4.95
Coatesville,Pa. L7 .... 5.25
Conshohocken,Pa. A3 .. 4.95
Detroit M1 ..... 4.95
Ecorse,Mich. G5 ..... 4.95
Fairfield,Ala. T2 ..... 4.85
Fontana,Calif.(30) K1 .. 5.60
Gary,Ind. U5 ..... 4.85
Geneva,Utah C11 ..... 4.85
GraniteCity,Ill. G4 .... 5.05
Harrisburg,Pa. P4 .... 5.80
Houston S5 ..... 4.95
Ind.Harbor,Ind. I-2, Y1 .. 4.85
Johnstown,Pa. B2 ..... 4.85
Lackawanna,N.Y. B2 .. 4.85
LoneStar,Tex. L6 ..... 5.20
Minnequa,Colo. C10 .... 5.70
Munhall,Pa. U5 ..... 4.85
Newport,Ky. A2 ..... 4.85
Pittsburgh J5 ..... 4.85
Sharon,Pa. S3 ..... 4.85
S.Chicago,Ill. U5, W14.. 4.85
SparrowsPoint,Md. B2.. 4.85
Sterling,Ill. N10 ..... 4.85
Steubenville,O. W10 .... 4.85
Warren,O. R2 ..... 4.85
Youngstown R2, U5, Y1.. 4.85

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 .... 6.20
Fontana,Calif. K1 .... 6.75
Geneva,Utah C11 .... 6.25
Johnstown,Pa. B2 .... 5.65
SparrowsPoint,Md. B2 .. 5.65

PLATES, Wrought Iron

Economy,Pa. B14 ..... 11.95

PLATES, H.S., L.A.

Aliquippa,Pa. J5 ..... 7.25
Bessemer,Ala. T2 ..... 7.25
Clairton,Pa. U5 ..... 7.25
Claymont,Del. C22 .... 7.55
Cleveland J5, R2 ..... 7.25
Coatesville,Pa. L7 .... 7.55
Conshohocken,Pa. A3 .. 7.25
Ecorse,Mich. G5 ..... 7.35
Fairfield,Ala. T2 ..... 7.25
Fontana,Calif.(30) K1 .. 8.00
Gary,Ind. U5 ..... 7.25
Geneva,Utah C11 ..... 7.25
Houston S5 ..... 7.35
Ind.Harbor,Ind. I-2, Y1.. 7.25
Johnstown,Pa. B2 ..... 7.25
Munhall,Pa. U5 ..... 7.25
Pittsburgh J5 ..... 7.25
Seattle B3 ..... 8.15
Sharon,Pa. S3 ..... 7.25
S.Chicago,Ill. U5, W14.. 7.25
SparrowsPoint,Md. B2 .. 7.25
Warren,O. R2 ..... 7.25
Youngstown U5, Y1 .... 7.25

PLATES, Alloy

Aliquippa,Pa. J5 ..... 6.85
Claymont,Del. C22 .... 6.85
Coatesville,Pa. L7 .... 6.85
Fontana,Calif.(30) K1 .. 7.60
Gary,Ind. U5 ..... 6.85
Houston S5 ..... 6.95
Ind.Harbor,Ind. Y1 .... 6.85
Johnstown,Pa. B2 ..... 6.85
Munhall,Pa. U5 ..... 6.85
Newport,Ky. A2 ..... 6.85
Pittsburgh J5 ..... 6.85
Seattle B3 ..... 7.75
Sharon,Pa. S3 ..... 6.85
S.Chicago,Ill. U5, W14.. 6.85
SparrowsPoint,Md. B2 .. 6.85
Youngstown Y1 ..... 6.85

FLOOR PLATES

Cleveland J5 ..... 5.925
Conshohocken,Pa. A3 .. 5.925
Harrisburg,Pa. P4 .... 6.275
Ind.Harbor,Ind. I-2 .... 5.925
Munhall,Pa. U5 ..... 5.925
S.Chicago,Ill. U5 .... 5.925

PLATES, Ingot Iron

Ashland c.l. (15) A10.. 5.10
Ashland l.c.l. (15) A10.. 5.60
Cleveland c.l. R2 ..... 5.60
Warren,O. c.l. R2 ..... 5.60

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 .. 5.075
Aliquippa,Pa.(9) J5 .. 5.075
Alton,Ill. L1 ..... 5.275
Atlanta(9) A11 ..... 5.575
Bessemer,Ala.(9) T2 .. 5.075
Birmingham(9) C15 .. 5.325
Bridgeport,Conn. N19 .. 5.30
Buffalo(9) R2 ..... 5.075
Clairton,Pa.(9) U5 .... 5.075
Cleveland(9) R2 ..... 5.075
Ecorse,Mich.(9) G5 .... 5.175
Emeryville,Calif. J7 .... 5.85
Fairfield,Ala.(9) T2 .. 5.075
Fairless,Pa.(9) U5 .... 5.225
Fontana,Calif.(9) K1 .. 5.775
Gary,Ind.(9) U5 ..... 5.075
Houston(9) S5 ..... 5.225
Ind.Harbor(9) I-2, Y1.. 5.075
Johnstown,Pa.(9) B2.. 5.075
Joliet,Ill. P22 ..... 5.075
KansasCity,Mo.(9) S5.. 5.325
Lackawanna(9) B2 ..... 5.075
LosAngeles(9) B3 .... 5.775
Milton,Pa. M18 ..... 5.225
Minnequa,Colo. C10 .. 5.525
Niles,Calif. P1 ..... 5.85
N.T'wanda,N.Y.(9)B11 5.425
Pittsburg,Calif.(9) C11.5.775
Pittsburgh(9) J5 ..... 5.075
Portland,Oreg. O4 .... 5.85
Seattle B3, N14 ..... 5.825
S.Ch'c'go(9)R2,U5,W14 5.075
S.Duquesne,Pa.(9) U5.. 5.075
S.SanFran.,Calif.(9)B3 5.825
Sterling,Ill.(1) N15 .. 5.075
Sterling,Ill. N15 ..... 5.175
Struthers,O. Y1 ..... 5.075
Torrance,Calif.(9) C11.5.775
Youngstown(9) R2, U5.5.075

BARS, H.R. Leaded Alloy (Including leaded extra)

Warren,O. C17 ..... 7.125

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 ..... 6.125
Bethlehem,Pa. B2 .... 6.125
Bridgeport,Conn. N19 .. 6.20
Buffalo R2 ..... 6.125
Canton,O. R2 ..... 6.125
Clairton,Pa. U5 ..... 6.125
Detroit R7 ..... 6.125
Ecorse,Mich. G5 ..... 6.225
Fairless,Pa. U5 ..... 6.275
Fontana,Calif. K1 .... 7.175
Gary,Ind. U5 ..... 6.125
Houston S5 ..... 6.375
Ind.Harbor,Ind. I-2, Y1.6.125
Johnstown,Pa. B2 .... 6.125
KansasCity,Mo. S5 .... 6.375
Lackawanna,N.Y. B2 .. 6.125
LosAngeles B3 ..... 7.175
Massillon,O. R2 ..... 6.125
Midland,Pa. C18 ..... 6.125
Pittsburgh J5 ..... 6.125
S.Chicago R2,U5,W14 .. 6.125
S.Duquesne,Pa. U5 .... 6.125
Struthers,O. Y1 ..... 6.125
Warren,O. C17 ..... 6.125
Youngstown U5 ..... 6.125

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 .... 7.425
Bessemer,Ala. T2 .... 7.425
Bethlehem,Pa. B2 .... 7.425
Bridgeport,Conn. N19 .. 7.50
Clairton,Pa. U5 ..... 7.425
Cleveland R2 ..... 7.425
Ecorse,Mich. G5 ..... 7.525
Fairfield,Ala. T2 .... 7.425
Fontana,Calif. K1 .... 8.125
Gary,Ind. U5 ..... 7.425
Houston S5 ..... 7.675
Ind.Harbor,Ind. Y1 .. 7.425
Johnston,Pa. B2 .... 7.425
KansasCity,Mo. S5 .... 7.675
Lackawanna,N.Y. B2.. 7.425
LosAngeles B3 ..... 8.125
Pittsburgh J5 ..... 7.425
Seattle B3 ..... 8.175
S.Chicago,Ill. U5, W14.7.425
S.Duquesne,Pa. U5 .... 7.425
S.SanFrancisco B3 .... 8.175
Struthers,O. Y1 ..... 7.425
Youngstown U5 ..... 7.425

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2.. 5.225
Houston(9) S5 ..... 5.325
KansasCity,Mo.(9) S5.. 5.325
Lackawanna(9) B2 .... 5.075
Sterling,Ill. N15 .... 5.175
Sterling,Ill.(1) N15 .. 5.075

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 ..... 5.075
Atlanta A11 ..... 5.575
Joliet,Ill. P22 ..... 5.075
Niles,Calif. P1 ..... 5.85
Pittsburgh J5 ..... 5.075
Portland,Oreg. O4 ..... 5.85
SanFrancisco S7 ..... 5.95

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 ..... 6.20
Clairton,Pa. U5 ..... 6.20
Gary,Ind. U5 ..... 6.20
Houston S5 ..... 6.45
KansasCity,Mo. S5 .... 6.45
Pittsburgh J5 ..... 6.20
Youngstown U5 ..... 6.20

BARS, C.F., Leaded Alloy (Including leaded extra)

Ambridge,Pa. W18 .... 9.475
BeaverFalls,Pa. M12 .. 9.475
Chicago W18 ..... 9.475
Cleveland C20 ..... 9.475
LosAngeles S30 ..... 11.10
LosAngeles P2 ..... 11.35
Monaca,Pa. S17 ..... 9.475
Newark,N.J. W18 ..... 9.65
Warren,O. C17 ..... 9.475

BARS, Cold-Finished Carbon

Amoridge,Pa. W18 .... 6.85
BeaverFalls,Pa. M12,R2.6.85
Birmingham C15 ..... 7.45
Bridgeport,Conn. N19 .. 7.20
Buffalo B5 ..... 6.90
Camden,N.J. P13 ..... 7.30
Carnegie,Pa. C12 ..... 6.85
Chicago W18 ..... 6.85
Cleveland A7, C20 .... 6.85
Detroit B5, P17 ..... 7.05
Detroit R7 ..... 6.85
Donora,Pa. W8 ..... 6.85
Elyria,O. W8 ..... 6.85
FranklinPark,Ill. N5 .. 6.85
Gary,Ind. U5 ..... 6.85
GreenBay,Wis. F7 .... 6.85
Hammond,Ind. L2, M13.6.85
Hartford,Conn. R2 .... 7.35
Harvey,Ill. B5 ..... 6.85
LosAngeles(49) S30 .... 8.30
LosAngeles R2 ..... 8.75
LosAngeles P2 ..... 8.30
Mansfield,Mass. B5 .... 7.40
Massillon,O. R2, R8 .... 6.85
Midland,Pa. C18 ..... 6.85
Monaca,Pa. S17 ..... 6.85
Newark,N.J. W18 ..... 7.30
NewCastle,Pa.(17) B4 .. 6.85
Plymouth,Mich. P5 .... 7.10
Putnam,Conn. W18 .... 7.40
Readville,Mass. C14 .... 7.40
S.Chicago,Ill. W14 .... 6.85
SpringCity,Pa. K3 .... 7.30
Struthers,O. Y1 ..... 6.85
Waukegan,Ill. A7 ..... 6.85
Youngstown F3, Y1 .... 6.85

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland Md.(5) C19.6.10

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 .... 8.325
BeaverFalls,Pa. M12,R2 8.325
Bethlehem,Pa. B2 .... 8.375
Bridgeport,Conn. N19 .. 8.475
Buffalo B5 ..... 8.325
Camden,N.J. P13 ..... 8.50
Canton,O. T7 ..... 8.325
Carnegie,Pa. C12 .... 8.325
Chicago W18 ..... 8.325
Cleveland A7, C20 .... 8.325
Detroit B5, P17 ..... 8.525
Detroit R7 ..... 8.325
Donora,Pa. A7 ..... 8.325
Elyria,O. W8 ..... 8.325
FranklinPark,Ill. N5 .. 8.375
Gary,Ind. R2 ..... 8.325
GreenBay,Wis. F7 .... 8.325
Hammond,Ind. L2,M13 8.325
Hartford,Conn. R2 .... 8.625
Harvey,Ill. B5 ..... 8.325
Lackawanna,N.Y. B2 .. 8.325
LosAngeles S30 ..... 10.10
LosAngeles P2 ..... 10.20
Mansfield,Mass. B5 .... 8.625
Massillon,O. R2, R8 .... 8.325
Midland,Pa. C18 ..... 8.325
Monaca,Pa. S17 ..... 8.325
Newark,N.J. W18 ..... 8.50
Plymouth,Mich. P5 .... 8.525
S.Chicago W14 ..... 8.325
SpringCity,Pa. K3 .... 8.50
Struthers,O. Y1 ..... 8.325
Warren,O. C17 ..... 8.325
Waukegan,Ill. A7 ..... 8.325
Worcester,Mass. A7 .... 8.625
Youngstown F3, Y1 .... 8.325

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 ..... 5.075
Atlanta A11 ..... 5.575
Birmingham C15 ..... 5.325
Bridgeport,Conn. N9 ... 5.30
Buffalo R2 ..... 5.075
Cleveland R2 ..... 5.075
Ecorse,Mich G5 ..... 5.425
Emeryville,Calif. J7 .... 5.85

Fairfield,Ala. T2 ....5.075
Fairless,Pa. U5 .....5.225
Ft.Worth,Tex. (4) T4..5.525
Gary,Ind. U5 .....5.075
Houston S5 .....5.325
Ind.Harbor,Ind. I-2 Y1 5.075
Johnstown,Pa. B2 ....5.075
Joliet,Ill. P22 .....5.075
KansasCity,Mo. S5 ....5.325
Lackawanna,N.Y. B2 ..5.075
LosAngeles B3 .....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ...5.525
Niles, Calif. P1 .....5.85
Pittsburg,Calif. C11 ..5.775
Pittsburgh J5 .....5.075
Portland,Oreg. O4 ....5.85
SandSprings,Okla. S5 ..5.575
Seattle B3, N14 .....5.825
S.Chicago,Ill. R2 ....5.075
S.Duquesne,Pa. U5 ....5.075
S.SanFrancisco B3 ....5.825
SparrowsPoint,Md. B2 .5.075
Sterling,Ill.(1) N15 ..5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Torrance,Calif. C11 ..5.775
Youngstown R2, U5 ..5.075

BARS, Reinforcing (Fabricated; to Consumers)

Boston B2 .....7.30
Chicago U8 .....6.81
Cleveland U8 .....6.79
Johnstown,Pa. ¼-1" B2 6.73
KansasCity,Mo. S5 .....7.00
Lackawanna,N.Y. B2 ..6.50
Marion,O. P11 .....6.70
NewYork U8 .....7.20
Pittsburgh J5, U8 ....6.75
Seattle B3, N14 .....7.20
SparrowsPt. ½-1" B2 ..6.73
Williamsport,Pa. S19 ..6.65

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 5.075
ChicagoHts.(4) I-2 ....6.10
ChicagoHts.(4) C2 ....5.65
Ft.Worth.Tex.(26) T4..5.525
Franklin,Pa.(3) F5 ....5.10
Franklin,Pa.(4) F5 ....6.10
JerseyShore,Pa.(4) J8 ..5.50
Marion,O.(3) P11 .....5.10
Moline,Ill.(3) R2 ....5.225
Tonawanda(3) B12 ....5.65
Tonawanda(4) B12 ....6.15
Williamsport,Pa.(3) S19 5.15

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 13.15
Economy,Pa.(D.R.)B14 16.35
Economy(Staybolt)B14, 16.80
McK.Rks.(S.R.) L5 ...13.15
McK.Rks.(D.R.) L5 ...18.00
McK.Rks.(Staybolt) L5 19.15

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 .....4.675
Allenport,Pa. P7 .....4.675
Ashland,Ky.(8) A10 ..4.675
Cleveland J5, R2 .....4.675
Conshohocken,Pa. A3..4.725
Detroit(8) M1 .....4.775
Ecorse,Mich. G5 .....4.775
Fairfield,Ala. T2 .....4.675
Fairless,Pa. U5 .....4.725
Fontana,Calif. K1 .....5.525
Gary,Ind. U5 .....4.675
Geneva,Utah C11 .....4.775
GraniteCity,Ill.(8) G4 ..4.875
Ind.Harbor,Ind. I-2, Y1 4.675
Irvin,Pa. U5 .....4.675
Lackawanna,N.Y. B2 ..4.675
Munhall,Pa. U5 .....4.675
Newport,Ky.(8) A2 ..4.675
Niles,O. M21 .....4.675
Pittsburg,Calif. C11 ..5.375
Pittsburgh J5 .....4.675
Portsmouth,O. P12 ....4.675
Riverdale,Ill. A1 .....4.675
Sharon,Pa. S3 .....4.675
S.Chicago,Ill. W14 ....4.675
SparrowsPoint,Md. B2 .4.675
Steubenville,O. W10 ..4.675
Warren,O. R2 .....4.675
Weirton,W.Va. W6 ....4.675
Youngstown U5, Y1 ...4.675

SHEETS, H.R. (19 Ga. & Lighter

Niles,O. M21 .....5.75

SHEETS, H.R. Alloy

Gary,Ind. U5 .....7.75
Ind.Harbor,Ind. Y1 ....7.75
Irvin,Pa. U5 .....7.75
Newport,Ky. A2 .....7.75
Youngstown Y1, U5 ....7.75

SHEETS, H.R. (14 Ga. & Heavier) High-strength Low-alloy

Cleveland J5, R2 .....6.90
Conshohocken,Pa. A3 ..6.95
Ecorse,Mich. G5 .....7.00
Fairfield,Ala. T2 .....6.90
Fairless,Pa. U5 .....6.95
Fontana,Calif. K1 .....7.75
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2, Y1 6.90
Irvin,Pa. U5 .....6.90
Lackawanna(35) B2 ...6.90
Munhall,Pa. U5 .....6.90
Pittsburgh J5 .....6.90
S.Chicago,Ill. U5 .....6.90
SparrowsPoint(36) B2 ..6.90
Warren,O. R2 .....6.90
Weirton,W.Va. W6 ....6.90
Youngstown U5, Y1 ...6.90

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..4.925
Cleveland R2 .....5.425
Ind.Harbor,Ind. I-2 ..4.925
Warren,O. R2 .....5.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....5.75
Cleveland J5, R2 .....5.75
Conshohocken,Pa. A3 ..5.80
Detroit M1 .....5.75
Ecorse,Mich. G5 .....5.85
Fairfield,Ala. T2 .....5.75
Fairless,Pa. U5 .....5.80
Follansbee,W.Va. F4 ..5.75
Fontana,Calif. K1 ....7.00
Gary,Ind. U5 .....5.75
GraniteCity,Ill. G4 ....5.95
Ind.Harbor,Ind. I-2, Y1 5.75
Irvin,Pa. U5 .....5.75
Lackawanna,N.Y. B2 ..5.75
Mansfield,O. E6 .....5.75
Middletown,O. A10 ....5.75
Newport,Ky. A2 .....5.75
Pittsburg,Calif. C11 ....6.70
Pittsburgh J5 .....5.75
Portsmouth,O. P12 ....5.75
SparrowsPoint,Md. B2 ..5.75
Steubenville,O. W10 ....5.75
Warren,O. R2 .....5.75
Weirton,W.Va. W6 ....5.75
Yorkville,O. W10 .....5.75
Youngstown Y1 .....5.75

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 ....8.525
Ecorse,Mich. G5 .....8.625
Fairless,Pa. U5 .....8.575
Fontana,Calif. K1 ....9.775
Gary,Ind. U5 .....8.525
IndianaHarbor,Ind. Y1,8.525
Irvin,Pa. U5 .....8.525
Lackawanna(37) B2 ..8.525
Pittsburgh J5 .....8.525
SparrowsPoint(38) B2 .8.525
Warren,O. R2 .....8.525
Weirton,W.Va. W6 ....8.525
Youngstown Y1 .....8.525

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.50
Middletown,O. A10 ....6.25
Warren,O. R2 .....6.50

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	6.65	6.90
Canton,O. R2	..6.65	7.15
Fairfield T2	....6.65	6.90
Gary,Ind. U5	....6.65	6.90
GraniteCity,IllG4	6.85	...
Ind.Harbor I-2	..6.65	6.90
Irvin,Pa. U5	....6.65	6.90
Kokomo,Ind. C16	6.75	...
MartinsFry. W10	6.65	...
Pittsburgh J5	....6.65	...
Pitts,Calif. C11	..7.40	...
SparrowsPt. B2	..6.65	...

SHEETS,, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....6.90
MartinsFry.,O. W10 ....6.90

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.30‡
Ashland,Ky. A10 .....6.30†
Canton,O. R2 .....6.30‡
Dover,O. R1 .....6.30†
Fairfield,Ala. T2 .....6.30†
Gary,Ind. U5 .....6.30†
GraniteCity,Ill. G4 ....6.50*
Ind.Harbor,Ind. I-2 ..6.30†
Irvin,Pa. U5 .....6.30†
Kokomo,Ind. C16 .....6.40‡
MartinsFerry,O. W10 ..6.30*
Middletown,O. A10 ....6.30†
Pittsburg,Calif. C11 ...7.05*
Pittsburgh J5 .....6.30†
SparrowsPt.,Md., B2 ..6.30†
Warren,O. R2 .....6.30†
Weirton,W.Va. W6 ....6.30*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEEETS, Well Casing

Fontana,Calif. K1 ....7.025

SHEETS, Galvanized High-Strength Low-Alloy

Irvin,Pa. U5 .....9.275
SparrowsPoint(39) B2..9.275

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.70
Irvin,Pa. U5 .....6.70

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.55
Middletown,O. A10 ....6.55

SHEETS, Electrogalvanized

Cleveland(28) R2 ....7.125
Niles,O.(28) R2 .....7.125
Weirton,W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 8.95
Butler,Pa. A10 (type 2) 9.05

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.325
Cleveland R2 .....6.325
Gary,Ind. U5 .....6.325
GraniteCity,Ill. G4 ....6.525
Ind.Harbor,Ind. I-2, Y1 6.325
Irvin,Pa. U5 .....6.325
Middletown,O. A10 ....6.325
Niles,O. M21 .....6.325
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.35
Ind.Harbor,Ind. I-2 ..8.175
Yorkville,O. W10 ....8.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.70
Gary,Ind. U5 .....6.70
Mansfield,O. E6 .....6.70
Middletown,O. A10 ....6.70
Niles,O. M21 .....6.70
Weirton,W.Va. W6 ....6.70

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .....7.10

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U.S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Division, Sharon Steel Corp.
D4 Disston Division, H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.
M22 Mill Strip Products Co.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U.S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&W.Co.
N19 Northeastern Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn.Coal & Iron Div., U.S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U.S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U.S. Steel Supply Div., U.S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.675
Allenport,Pa. P7	4.675
Alton,Ill. L1	4.875
Ashland,Ky.(8) A10	4.675
Atlanta A11	4.875
Bessemer,Ala. T2	4.675
Birmingham C15	4.925
Buffalo(27) R2	4.675
Conshohocken,Pa. A3	4.725
Detroit M1	4.775
Ecorse,Mich. G5	4.775
Fairfield,Ala. T2	4.675
Fontana,Calif. K1	5.525
Gary,Ind. U5	4.675
Houston S5	4.925
Ind.Harbor,Ind. I-2, Y1	4.675
Johnstown,Pa.(25) B2	4.675
KansasCity,Mo. S5	4.925
Lackaw'na,N.Y.(25) B2	4.675
LosAngeles(25) B3	5.425
Minnequa,Colo. C10	5.775
Pittsburg,Calif. C11	5.425
Riverdale,Ill. A1	4.675
SanFrancisco S7	5.95
Seattle(25) B3	5.675
Seattle N14	5.675
Sharon,Pa. S3	4.675
S.Chicago,Ill. W14	4.675
S.SanFrancisco(25) B3	5.425
SparrowsPoint,Md. B2	4.675
Sterling,Ill.(1) N15	4.675
Sterling,Ill. N15	4.775
Torrance,Calif. C11	5.425
Warren,O. R2	4.675
Weirton,W.Va. W6	4.675
Youngstown U5	4.675

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	7.75
Gary,Ind. U5	7.75
Ind.Harbor,Ind. Y1	7.75
LosAngeles B3	8.95
Newport,Ky. A2	7.75
Sharon,Pa. S3	7.75
S.Chicago,Ill. W14	7.75
Youngstown U5, Y1	7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	6.95
Conshohocken,Pa. A3	6.95
Ecorse,Mich. G5	7.05
Fairfield,Ala. T2	6.95
Gary,Ind. U5	6.95
Houston S5	7.20
Ind.Harbor,Ind. I-2, Y1	6.95
KansasCity,Mo. S5	7.20
Lackawanna,N.Y. B2	6.95
LosAngeles(25) B3	7.70
Seattle(25) B3	7.95
Sharon,Pa. S3	6.95
S.SanFrancisco(25) B3	7.70
SparrowsPoint,Md. B2	6.95
Warren,O. R2	6.95
Weirton,W.Va. W6	6.95
Youngstown U5, Y1	6.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.925
Warren,O. R2	5.425

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.85
Baltimore T6	6.85
Boston T6	7.40
Buffalo S40	6.85
Cleveland A7, J5	6.85
Conshohocken,Pa. A3	6.90
Dearborn,Mich. D3	6.95
Detroit D2, M1, P20	6.95
Dover,O. G6	6.85
Ecorse,Mich. G5	6.95
Evanston,Ill. M22	*6.95*
Follansbee,W.Va. F4	6.85
Fontana,Calif. K1	8.70
FranklinPark,Ill. T6	6.95
Ind.Harbor,Ind. Y1	6.85
Indianapolis C8	7.00
LosAngeles C1	8.90
NewBedford,Mass. R10	7.30
NewBritain(10) S15	6.85
NewCastle,Pa. B4, E5	6.85
NewHaven,Conn. D2	7.30
NewKensington,Pa. A6	6.85
Pawtucket,R.I. R3	7.50
Pawtucket,R.I. N8	7.40
Pittsburgh J5	6.85
Riverdale,Ill. A1	6.95
Rome,N.Y.(32) R6	6.85
Sharon,Pa. S3	6.85
Trenton,N.J.(31) R5	8.30
Wallingford,Conn. W2	7.30
Warren,O. R2, T5	6.85
Weirton,W.Va. W6	6.85
Worcester,Mass. A7	7.40
Youngstown C8, Y1	6.85

STRIP, Cold-Rolled Alloy

Boston T6	14.90
Carnegie,Pa. S18	14.55
Cleveland A7	14.55
Dover,O. G6	14.55
FranklinPark,Ill. T6	14.55
Harrison,N.J. C18	14.55
Indianapolis C8	14.70
Pawtucket,R.I. N8	14.90
Sharon,Pa. S3	14.55
Worcester,Mass. A7	14.85
Youngstown C8	14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.00
Dearborn,Mich. D3	10.10
Dover,O. G6	10.10
Ecorse,Mich. G5	10.10
Ind.Harbor,Ind. Y1	10.20
Sharon,Pa. S3	10.00
Warren,O. R2	10.00
Weirton,W.Va. W6	10.00
Youngstown Y1	10.20

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	7.60

STRIP, C.R. Electrogalvanized

Cleveland A7	6.85*
Dover,O. G6	6.85*
Evanston,Ill. M22	*6.95*
Riverdale,Ill. A1	6.95*
Warren,O. B9, T5	6.85*
Worcester,Mass. A7	7.40*
Youngstown C8	6.85*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.975

TIGHT COOPERAGE HOOP

Atlanta A11	5.40
Riverdale,Ill. A1	5.25
Sharon,Pa. S3	5.10
Youngstown U5	5.10

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.20	10.40	12.60	15.60	18.55
Boston T6	9.20	10.40	12.60	15.60	18.55
Bristol,Conn. W1	...	10.40	12.60	15.60	18.55
Carnegie,Pa. S18	8.65	10.10	12.30	15.30	....
Cleveland A7	8.65	10.10	12.30	15.30	18.25
Cleveland C7	...	10.10	12.30	15.30	18.25
Dover,O. G6	8.65	10.10	12.30	15.30	18.25
Detroit D2	8.75	10.20	12.40	15.40	....
Dearborn,Mich. D3	8.75	10.20	12.40	....	....
Evanston,Ill. M22	*8.65*	*10.10*	*12.30*	....	....
FranklinPark,Ill. T6	8.75	10.10	12.30	15.30	18.25
Harrison,N.J. C18	...	....	12.60	15.60	18.55
Indianapolis C8	8.80	10.25	12.30	15.30	18.25
LosAngeles C1	10.85	12.30	14.50	....	....
NewBritain,Conn.(10) S15	8.65	10.10	12.30	15.30	18.25
NewCastle,Pa. B4, E5	8.65	10.10	12.30	15.30	....
NewHaven,Conn. D2	9.10	10.40	12.60	15.60	....
NewKensington,Pa. A6	8.65	10.10	12.30	15.30	....
New York W3	...	10.40	12.60	15.60	18.55
Pawtucket,R.I. N8	9.20	10.40	12.60	15.60	18.55
Riverdale,Ill. A1	8.75	10.10	12.30	15.30	18.25
Rome,N.Y.(32) R6	8.65	10.10	12.30	15.30	18.25
Sharon,Pa. S3	8.65	10.10	12.30	15.30	18.25
Trenton,N.J. R5	...	10.40	12.60	15.60	18.55
Wallingford,Conn. W2	9.10	10.40	12.60	15.60	18.45
Warren,O. T5	8.65	10.10	12.30	15.30	18.25
Worcester,Mass. A7, T6	9.20	10.40	12.60	15.60	18.55
Youngstown C8	8.65	10.10	12.30	15.30	18.25

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	17.10	20.95	25.30
Buffalo W12	17.10	....	....
FranklinPark,Ill. T6	17.15	21.00	25.35
Harrison,N.J. C18	17.10	20.95	25.30
NewYork W3	17.10	20.95	25.30
Palmer,Mass. W12	17.10	....	....
Trenton,N.J. R5	17.10	20.95	25.30
Worcester,Mass. A7, T6	17.10	20.95	25.30
Youngstown C8	17.45	21.30	25.65

SILICON STEEL

H.R. SHEETS(22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	....	11.00	12.05	13.05
Brackenridge,Pa. A4	....	....	11.00	12.05	13.05
Mansfield,O. E6	9.20	10.35	11.00	12.05	13.05
Newport,Ky. A2	9.20	10.35	11.00	12.05	13.05
Niles,O. M21	9.20	10.35	11.00	12.05	....
Vandergrift,Pa. U5	....	10.35	11.00	12.05	13.05
Warren,O. R2	9.20	10.35	11.00	12.05	....
Zanesville,O. A10	....	10.35	11.00	12.05	13.05
Zanesville,O. A10 (FP coils)	....	10.85	11.525	12.575	13.55
Zanesville,O. A10 (SP coils)	....	....	11.025	12.075	13.05

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	....	....	....	11.525	12.575 13.55
GraniteCity,Ill. G4	9.40*	10.55*	11.225*	12.275*	....
IndianaHarbor,Ind. I-2	9.20†	10.35*	11.025*	12.075*	....
Mansfield,O. E6	9.70	10.85	11.525	12.575	13.55
Vandergrift,Pa. U5	9.20*	10.35*	11.025*	12.075*	13.05*
Vandergrift,Pa. U5	....	...	10.85†	11.525†	12.575† 13.55†
Warren,O. R2	9.20*	10.85	11.525	12.575	13.55

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	14.05	14.60	15.10	16.15
Brackenridge,Pa. A4	14.05	....	....	....
Vandergrift,Pa. U5	14.05	14.60	15.10	16.15
Zanesville,O. A10	14.05	14.60	15.10	16.15

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	16.90	18.50	19.00	19.50	....
Butler,Pa. A10	....	....	18.50	19.00	19.50	....
Vandergrift,Pa. U5	15.90	16.90	18.50	19.00	19.50	14.55**
Warren,O. R2	....	....	....	....	....	14.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.40	$8.65	$9.05
Fairfield,Ala. T2	8.50	8.75	9.15
Fairless,Pa. U5	8.50	8.75	9.15
Fontana,Calif. K1	9.15	9.40	9.80
Gary,Ind. U5	8.40	8.65	9.05
GraniteCity,Ill. G4	8.50	8.75	9.15
IndianaHarbor,Ind. I-2, Y1	8.40	8.65	9.05
Irvin,Pa. U5	8.40	8.65	9.05
Niles,O. R2	8.40	8.65	9.05
Pittsburg,Calif. C11	9.15	9.40	9.80
SparrowsPoint,Md. B2	8.50	8.75	9.15
Weirton,W.Va. W6	8.40	8.65	9.05
Yorkville,O. W10	8.40	8.65	9.05

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.425	7.625	....
Niles,O. R2	7.425	7.625	7.925

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.70	$9.95
Fairfield,Ala. T2	9.80	10.05
Fairless,Pa. U5	9.80	10.05
Fontana,Calif. K1	10.45	10.70
Gary,Ind. U5	9.70	9.95
Irvin,Pa. U5	9.70	9.95
Pitts.,Calif. C11	10.45	10.70
Sp.Pt.,Md., B2	9.80	10.05
Weirton,W.Va. W6	9.70	9.95
Yorkville,O. W10	9.70	9.95

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.50
Fairfield,Ala. T2	7.60
Fairless,Pa. U5	7.60
Fontana,Calif. K1	8.25
Gary,Ind. U5	7.50
GraniteCity,Ill. G4	7.60
Ind.Harbor,Ind. I-2, Y1	7.50
Irvin,Pa. U5	7.50
Niles,O. R2	7.50
Pittsburg,Calif. C11	8.25
SparrowsPoint,Md. B2	7.60
Weirton,W.Va. W6	7.50
Yorkville,O. W10	7.50

HOLLOWARE ENAMELING Black Plate (29 Gage)	
Aliquippa,Pa. J5	$7.15
Gary,Ind. U5	7.15
GraniteCity,Ill. G4	7.25
Ind.Harbor,Ind. Y1	7.15
Irvin,Pa. U5	7.15
Yorkville,O. W10	7.15

MANUFACTURING TERNES (Special Coated; Base Box)	
Gary,Ind. U5	$9.20
Irvin,Pa. U5	9.20

ROOFING SHORT TERNES (8 lb Coated; Base Box)	
Gary,Ind. U5	$10.75

WIRE

WIRE, Manufacturers Bright, Low Carbon	
AlabamaCity,Ala. R2	7.20
Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.40
Atlanta A11	7.40
Bartonville,Ill. K4	7.30
Buffalo W12	7.20
Chicago W13	7.20
Cleveland A7, C20	7.20
Crawfordsville,Ind. M8	7.30
Donora,Pa. A7	7.20
Duluth A7	7.20
Fairfield,Ala. T2	7.20
Fostoria,O.(24) S1	7.30
Houston S5	7.45
Jacksonville,Fla. M8	7.55
Johnstown,Pa. B2	7.20
Joliet,Ill. A7	7.20
KansasCity,Mo. S5	7.45
Kokomo,Ind. C16	7.30
LosAngeles B3	8.15
Minnequa,Colo. C10	7.45
Monessen,Pa. P7, P16	7.20
N.Tonawanda,N.Y. B11	7.20
Palmer,Mass. W12	7.50
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.20
Rankin,Pa. A7	7.20
S.Chicago,Ill. R2	7.20
S.SanFrancisco C10	8.15
SparrowsPoint,Md. B2	7.30
Sterling,Ill.(1) N15	7.20
Sterling,Ill. N15	7.30
Struthers,O. Y1	7.20
Waukegan,Ill. A7	7.20
Worcester,Mass. A7	7.50

WIRE, Gal'd ACSR for Cores	
Bartonville,Ill. K4	11.90
Buffalo W12	11.90
Cleveland A7	11.90
Donora,Pa. A7	11.90
Duluth A7	11.90
Johnstown,Pa. B2	11.90
Minnequa,Colo. C10	12.025
Monessen,Pa. P16	11.90
Muncie,Ind. I-7	12.10
NewHaven,Conn. A7	12.20
Palmer,Mass. W12	12.20
Pittsburg,Calif. C11	12.70
Portsmouth,O. P12	11.90
Roebling,N.J. R5	12.20
SparrowsPt.,Md. B2	12.00
Struthers,O. Y1	11.75
Trenton,N.J. A7	12.20
Waukegan,Ill. A7	11.90
Worcester,Mass. A7	12.20

WIRE, Upholstery Spring	
Aliquippa,Pa. J5	8.70
Alton,Ill. L1	8.90
Buffalo W12	8.70
Cleveland A7	8.70
Donora,Pa. A7	8.70
Duluth A7	8.70
Johnstown,Pa. B2	8.70
KansasCity,Mo. S5	8.65
Minnequa,Colo. C10	8.90
LosAngeles B3	9.65
Monessen,Pa. P7, P16	8.70
NewHaven,Conn. A7	9.00
Palmer,Mass. W12	9.00
Pittsburg,Calif. C11	9.65
Portsmouth,O. P12	8.70
Roebling,N.J. R5	8.70
S.Chicago,Ill. R2	8.70
S.SanFrancisco C10	9.35
SparrowsPt.,Md. B2	8.80
Struthers,O. Y1	8.40
Trenton,N.J. A7	9.00
Waukegan,Ill. A7	8.70
Worcester,Mass. A7	9.00

WIRE, MB Spring, High Carbon	
Aliquippa,Pa. J5	9.025
Alton,Ill. L1	9.225
Bartonville,Ill. K4	9.125
Buffalo W12	9.025
Cleveland A7	9.025
Donora,Pa. A7	9.025
Duluth A7	9.025
Fostoria,O. S1	9.075
Johnstown,Pa. B2	9.025
LosAngeles B3	9.975
Milbury,Mass.(12) N6	9.325
Minnequa,Colo. C10	9.275
Monessen,Pa. P7, P16	9.025
Muncie,Ind. I-7	9.225
Palmer,Mass. W12	9.325
Pittsburg,Calif. C11	9.975
Portsmouth,O. P12	9.025
Roebling,N.J. R5	9.025
S.Chicago,Ill. R2	9.025
S.SanFrancisco C10	9.675
SparrowsPt.,Md. B2	9.125
Struthers,O. Y1	8.725
Trenton,N.J. A7	9.325
Waukegan,Ill. A7	9.025
Worcester J4, T6, W12	*9.325*
Worcester,Mass. A7	9.325

WIRE, Fine & Weaving(8" Coils)	
Alton,Ill. L1	14.35
Bartonville,Ill. K4	14.25
Buffalo W12	14.45
Chicago W13	*14.45*
Cleveland A7	14.45
Crawfordsville,Ind. M8	14.25
Fostoria,O. S1	14.45
Jacksonville,Fla. M8	14.50
Johnstown,Pa. B2	14.15
Kokomo,Ind. C16	*14.45*
Monessen,Pa. P6	14.20
Muncie,Ind. I-7	*14.65*
Palmer,Mass. W12	14.75
Roebling,N.J. C10	14.45
S.SanFrancisco C10	14.50
Waukegan,Ill. A7	14.45
Worcester,Mass. A7, T6	14.75

ROPE WIRE	(A)
Bartonville,Ill. K4	12.00
Buffalo W12	12.00
Fostoria,O. S1	12.00
Johnstown,Pa. B2	*12.00*
Monessen,Pa. P7	11.55
Muncie,Ind. I-7	*12.20*
Palmer,Mass. W12	12.30
Portsmouth,O. P12	12.00
Roebling,N.J. R5	12.30
SparrowsPt.,Md. B2	*12.10*
Struthers,O. Y1	11.55
Worcester,Mass. J4	*12.30*

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE

WIRE, Tire Bead
Bartonville,Ill. K4 ....15.75
Monessen,Pa. P16 ....15.45
Roebling,N.J. R5 .....16.10

WIRE, Cold-Rolled Flat
Anderson,Ind. G6 .....10.75
Baltimore T6 .....11.05
Boston T6 .....11.05
Buffalo W12 .....10.75
Chicago W13 .....10.85
Cleveland A7 .....10.75
Crawfordsville,Ind. M8 10.75
Dover,O. G6 .....10.75
Fostoria,O. S1 .....11.05
FranklinPark,Ill. T6 ..10.85
Kokomo,Ind. C16 .....10.75
Massillon,O. R8 .....10.75
Milwaukee C23 .....10.95
Monessen,Pa. P7, P16 10.75
NewKensington,Pa. A6 10.75
Palmer,Mass. W12 ....11.05
Pawtucket,R.I. N8 ....11.05
Riverdale,Ill. A1 .....10.85
Rome,N.Y. R6 .....10.75
Trenton,N.J. R5 .....11.05
Worcester,Mass. A7, T6 11.05

NAILS & POLISHED STAPLES,

Stock	Col.
AlabamaCity,Ala. R2	..164
Aliquippa,Pa. J5	164
Atlanta A11	166
Bartonville,Ill. K4	166
Crawfordsville,Ind. M8	.166
Donora,Pa. A7	164
Duluth A7	164
Fairfield,Ala. T2	164
Houston,Tex. S5	169
Jack'ville,Fla. (20) M8	.175
Johnstown,Pa. B2	164
Joliet,Ill. A7	164
KansasCity,Mo. S5	169
Kokomo,Ind. C16	166
Minnequa,Colo. C10	169
Monessen,Pa. P7	164
Pittsburg,Calif. C11	183
Rankin,Pa. A7	164
S.Chicago,Ill. R2	164
SparrowsPt.,Md. B2	166
Sterling,Ill. (7) N15	166
Worcester,Mass. A7	170

NAILS, Stock

	Col.
Chicago W13	164
Cleveland A9	170

(To Wholessalers; per cwt)
Galveston,Tex. D7 ....$8.75

NAILS, Cut (100 lb keg)
To Dealers (33)
Conshohocken,Pa. A3 ..$9.80
Wheeling,W.Va. W10 ..9.80

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	..$9.53
Atlanta A11	.....9.63
Bartonville,Ill. K4	....9.63
Buffalo W12	.....9.93
Chicago W13	*.....9.82*
Crawfordsville,Ind. M8	..9.63
Donora,Pa. A7	*.....9.82*
Duluth A7	*.....9.82*
Fairfield,Ala. T2	*.....9.82*
Houston S5	.....9.78
Jack'ville,Fla. M8	....10.09
Johnstown,Pa. B2	.....9.53
Joliet,Ill. A7	*.....9.82*
KansasCity,Mo. S5	....9.78
Kokomo,Ind. C16	*.....9.92*
LosAngeles B3	.....10.32
Minnequa,Colo. C10	...10.07
Pittsburg,Calif. C11	*....10.60*
S.Chicago,Ill. R2	.....9.53
S.SanFrancisco C10	...10.31
SparrowsPt.,Md. B2	....9.63
Sterling,Ill.(37)N15	*.....9.82*

Coil No. 6500 Stand.	
AlabamaCity,Ala. R2..	$9.85
Atlanta A11	.....9.95
Bartonville,Ill. K4	....9.95
Buffalo W12	.....10.25
Chicago W13	*.....10.15*
Crawfordsville,Ind. M8.	.9.95
Donora,Pa. A7	*.....10.15*
Duluth A7	*.....10.15*
Fairfield,Ala. T2	*.....10.15*
Houston S5	.....10.10
Jacksonville,Fla. M8	...10.41
Johnstown,Pa. B2	....9.85
Joliet,Ill. A7	*.....10.15*
KansasCity,Mo. S5	....10.10
Kokomo,Ind. C16	*.....10.25*
LosAngeles B3	.....10.65
Minnequa,Colo. C10	...10.40
Pittsburg,Calif. C11	*....10.95*
S.Chicago,Ill. R2	.....9.85
S.SanFrancisco C10	...10.65
SparrowsPt.,Md. B2	....9.95
Sterling,Ill.(37) N15	*.....10.15*

Coil Interim	
AlabamaCity,Ala. R2	.$9.90
Atlanta A11	.....10.00
Bartonville,Ill. K4	....10.00
Buffalo W12	.....10.30
Chicago W13	*.....10.20*
Crawfordsville,Ind.	M8.10.00
Donora,Pa. A7	*.....10.20*
Duluth A7	*.....10.20*
Fairfield,Ala. T2	*.....10.20*
Houston S5	.....10.15
Jacksonville,Fla. M8	...10.46
Johnstown,Pa. B2	....9.90
Joliet,Ill. A7	*.....10.20*
KansasCity,Mo. S5	....10.15
Kokomo,Ind. C16	*.....10.30*
LosAngeles B3	.....10.70
Minnequa,Colo. C10	...10.45
Pittsburg,Calif. C11	*....11.00*
S.Chicago,Ill. R2	.....9.90
S.SanFrancisco C10	...10.70
SparrowsPt.,Md. B2	...10.00
Sterling,Ill.(37) N15	*....10.20*

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	..190
Atlanta A11	192
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	.192
Donora,Pa. A7	*.....196*
Duluth A7	*.....196*
Fairfield,Ala. T2	*.....196*
Houston S5	195
Jacksonville,Fla. M8	...197
Joliet,Ill. A7	190
KansasCity,Mo. S5	195
Kokomo,Ind. C16	*.....198*
Minnequa,Colo. C10	195
Pitts,Calif. C11	*.....220*
S.Chicago,Ill. R2	190
S.SanFrancisco C10	214
Sterling,Ill. (7) N15	*.....196*
SparrowsPoint,Md. B2	..192
Tonawanda,N.Y. B12	..169
Williamsport,Pa. S19	175

FENCE POSTS
ChicagoHts.,Ill. C2, I-2 .167
Duluth A7 167
Franklin,Pa. F5 167
Huntington,W.Va. W7 ..169
Johnstown,Pa. B2 167
Marion,O. P11 167
Minnequa,Colo. C10 172
Sterling,Ill.(1) N15 167
Tonawanda,N.Y. B12 ..169
Williamsport,Pa. S19 175

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	..184**
AliquippaPa. J5	.....181§
Atlanta A11	.....190*
Bartonville,Ill. K4	190
Crawfordsville,Ind. M8	..190
Donora,Pa. A7	.....184†
Duluth A7	.....184†
Fairfield,Ala. T2	.....184†
Houston,Tex. S5	.....189**
Jacksonville,Fla. M8	...195
Johnstown,Pa. B2	.....188*
Joliet,Ill. A7	.....184†
KansasCity,Mo. S5	....189**
Kokomo,Ind. C16	.....186†
Minnequa,Colo. C10	...189**
Monessen,Pa. P7	.....188*
Pittsburg,Calif. C11	....204†
Rankin,Pa. A7	.....184†
S.Chicago,Ill. R2	.....184**
S.SanFrancisco C10	...204**
SparrowsPoint,Md. B2	190*
Sterling,Ill.(7) N15	....190*

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	....176**
Aliq'ppa,Pa. 9-14½ga.J5	179§
Atlanta A11	.....182*
Bartonville,Ill. K4	182
Crawfordsville,Ind. M8	..182
Donora,Pa. A7	.....176†
Duluth A7	.....176†
Fairfield,Ala. T2	.....176†
Houston,Tex. S5	....181**
Jacksonville,Fla. M8	...187
Johnstown,Pa.(43) B2	..180*
Joliet,Ill. A7	.....176†
KansasCity,Mo. S5	....181**
Kokomo,Ind. C16	.....178†
Minnequa,Colo. C10	....181**
Monessen,Pa. 9 ga. P7	..180*
Pittsburgh,Calif. C11	..199†
Rankin,Pa. A7	.....176†
S.Chicago,Ill. R2	.....176**
Sterling,Ill.(7) N15	....182*

WIRE (16 gage)

	An'ld Galv.	Stone
Ala.City,Ala.R2	15.70	17.25**
Aliq'ppa,Pa. J5	..15.70	17.50
Bartonville K4	..15.80	17.75
Buffalo W12	....16.10	....
Cleveland A7	....16.00	....
Crawfordsville M8	15.80	17.75
Fostoria,O. S1	..16.50	18.05†
Houston S5	....15.95	17.50**
Jacksonville M8	16.05	18.00
Johnstown B2	..15.70	17.65*
Kan.City,Mo. S5	15.95	....
Kokomo C16	*16.10*	*17.65†*
Minnequa C10	..16.25	17.80*
P'lm'r Mass.W12	16.30	17.85†
Pitts.,Calif. C11	*16.35*	*17.90†*
SparrowsPt.	B2.15.80	17.75*
Sterling(37) N15	*16.00*	*17.95**
Waukegan A7	..16.00	17.55†
Worcester A7	..16.30	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv.
Ala. City,Ala. R2	7.95 8.35**
Aliquippa J5	....7.95 8.475§
Atlanta (48) A11	8.05 8.65*
Bartonville(48)	K4.8.05 8.65
Buffalo W12	.....8.20 8.75†
Cleveland A7	.....8.20 ....
Crawfordsville M8	.8.05 8.65
Donora,Pa. A7	...8.20 8.75†
Duluth A7	.....8.20 8.75†
Fairfield T2	.....8.20 8.75†
Houston(48) S5	.8.20 8.60**
Jacks'ville,Fla.	M8 8.30 8.90
Johnstown B2 (48)	8.20 8.95*
Joliet,Ill. A7	.....8.20 8.75†
Kans.City(48) S5	8.20 8.60**
Kokomo C16	*.....8.30 8.85†*
LosAngeles B3	...8.90 9.50*
Minnequa C10	....8.45 9.00‡
Monessen P7 (48)	7.95 8.55*
Palmer,Mass. W12	8.50 9.05†
Pitts.,Calif. C11	..9.15 9.70†
Rankin,Pa. A7	...8.20 8.75†
S.Chicago R2	....7.95 8.35**
S.SanFran. C10	8.90 9.30**
Spar'wsPt. B2(48)	8.30 9.05*
Sterling(37)(48)N15	*8.35 9.10*
Struth rs.O.(48)Y1	7.95 8.45‡
Worcester,Mass. A7	8.50 9.05†

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††13c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)
½ in. and smaller:
6 in. and shorter.... 52.5
Lower than 6 in. .. 43.5
⅝ in. thru 1 in.:
6 in. and shorter... 43.5
Longer than 6 in.... 41.5
1¼ in. and larger:
All lengths 41.5
Undersized Body (rolled thread)
½ in. and smaller:
6 in. and shorter... 52.5
Carriage, Machine, Lag Bolts
Hot Galvanized:
½ in. and smaller:
6 in. and shorter... 32.0
Longer than 6 in. .. 19.0
⅝ in. thru 1 in.:
6 in. and shorter... 16.0
Longer than 6 in. .. 16.0
1¼ in. and larger:
All lengths 16.0
Lag Bolts
All diameters:
6 in. and shorter... 52.5
Longer than 6 in. .. 44.5
Plow and Tap Bolts
½ in. and smaller by 6 in. and shorter 52.0
Larger than ½ in. or longer than 6 in. .. 44.5
Blank Bolts 44.5
Step, Elevator, Tire Bolts 52.0
Stove Bolts, Slotted
⅛ to ¼-in., incl.,
3 in. and shorter.. 54.00
⅛ to ½-in., inclusive 54.00

NUTS

Reg. & Heavy Square Nuts:
All sizes 58.0
Square Nuts, Reg. & Heavy, Hot Galvanized:
All sizes 44.0
Hex Nuts, Reg. & Heavy, Hot Pressed:

¾ in. and smaller..	61.5
⅞ in. to 1 in., incl.	57.5
1⅛ in. to 1½ in., incl.	62.5
1⅝ in. and larger..	56.0

Hex Nuts, Reg. & Heavy, Cold Punched:

¾ in. and smaller..	61.5
⅞ in. to 1⅛ in., incl.	57.5
1⅜ in. and larger..	56.0

Hex Nuts, All Types, Hot Galvanized:

¾ in. and smaller..	48.0
⅞ in. to 1 in. incl.	44.0
1⅛ in. to 1½ in., incl.	49.0
1⅝ in. and larger..	56.0

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller..	61.5
⅞ in. to 1½ in., incl.	57.5
1⅝ in. and larger..	56.0

Hex Nuts, Finished (Incl. Slotted and Castellated):

1 in. and smaller...	64.00
1⅛ in. to 1½ in., incl.	60.5
1⅝ in. and larger..	56.0

Semifinished Hex Nuts, Reg. (Including Slotted):

⅝ in. and smaller..	61.5
¾ in. to 1-in., incl...	64.0
1⅛ in. to 1.5-in., incl.	60.5
1⅝ in. and larger...	56.0

CAP AND SET SCREWS
(Base discounts, packages, per cent off list, f.o.b. mill)
Hex Head Cap Screws, Coarse or Fine Thread, Bright:
6 in. and shorter:

½ in. and smaller..	44.0
¾, ⅞ and 1 in. diam.	27.0

Longer than 6 in.:

½ in. and smaller..	14.0
¾, ⅞ and 1 in. diam.	0.5

High Carbon, Heat Treated:
6 in. and shorter:

⅝ in. and smaller..	31.0
¾, ⅞ and 1 in. diam.	9.0

Longer than 6 in.:

⅝ in. and smaller..	+ 6
¾, ⅞ and 1 in. diam.	+24

Flat Head Cap Screws:
¾ in. and smaller.. +65.0
Set Screws, Square Head, Cup Point, Coarse Thread
Through 1 in. diam.:
6 in. and shorter ... 11
Longer than 6 in. ..+10

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.
Structural ½-in., larger 11.50
$\frac{7}{16}$-in. under List less 23%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	24.55	22.84
1¼	13	....	29.07	22.68
1½	13	27.45	32.14	25.08
1¾	13	32.43	37.97	29.64
2	13	36.34	42.56	33.21
2¼	13	40.93	47.94	37.42
2½	12	44.42	52.03	40.61
2½	12	48.94	57.31	44.73
2¾	12	52.99	62.05	48.44
3	12	56.51	66.18	51.66

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	5.275	5.175	5.225	6.25
Ensley,Ala. T2	5.275	5.175	....	6.25
Fairfield,Ala. T2	....	....	....	6.25
Huntington,W.Va. C15	....	....	....	6.25
Gary,Ind. U5	5.275	5.175	5.225	...
IndianaHarbor,Ind. I-2	5.275	5.175	5.225	...
Johnstown,Pa. B2	....	....	...(16)	6.25
Lackawanna,N.Y. B2	5.275	5.175	....	6.25
Minnequa,Colo. C10	5.275	5.175	....	6.75
Steelton,Pa. B2	5.275	5.175	....	...
Williamsport,Pa. S19	....	....	....	6.15

TIE PLATES

Fairfield,Ala. T2	.....6.275
Gary,Ind. U5	.....6.275
Ind.Harbor,Ind. I-2	....6.275
Lackawanna,N.Y. B2	..6.275
Minnequa,Colo. C10	..6.275
Seattle B3	.....6.175
Steelton,Pa. B2	.....6.275
Torrance,Calif. C11	....6.425

JOINT BARS

Bessemer,Pa. U5	.....6.60
Fairfield,Ala. T2	.....6.60
Ind.Harbor,Ind. I-2	....6.60
Joliet,Ill. U5	.....6.60
Lackawanna,N.Y. B2	...6.60
Minnequa,Colo. C10	....6.60
Steelton,Pa. B2	.....6.60

AXLES

Ind.Harbor,Ind. S13	....8.35
Johnstown,Pa. B2	.....8.35

TRACK BOLTS, Untreated

Cleveland R2	.....13.85
KansasCity,Mo. S5	....13.10
Lebanon,Pa. B2	.....13.85
Minnequa,Colo. C10	....13.85
Pittsburgh P14	.....13.10
Seattle B3	.....13.60

SCREW SPIKES

Lebanon,Pa. B2	.....13.60
Pittsburgh P14	.....12.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	....9.225
Ind.Harbor,Ind. I-2,Y1	9.225
KansasCity,Mo. S5	....8.775
Lebanon,Pa. B2	.....9.225
Minnequa,Colo. C10	....9.225
Pittsburgh J5	.....9.225
Seattle B3	.....9.275
S.Chicago,Ill. R2	.....9.225
Struthers,O. Y1	.....9.225
Youngstown R2	.....9.225

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 5/16 in.; 6.23c; 1 15/16 to 8 in.; inclusive, 6.60c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn. base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone,5.685c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 7.30c, for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 8.65c, over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+5.25	+23.25	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25
Ambridge, Pa. N2	+5.25	....	1.25	....	3.75	....	5.25	....	5.25	....	5	....	7.5	....
Lorain, O. N3	+5.25	+23.25	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25
Youngstown Y1	+2.75	+20.75	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+5.25	+23.25	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	¼		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Alton, Ill. L1	....	....	....	....	....	....	7.25	+12	10.25	+8	13.75	+3.5	16.25	+1.75
Benwood, W. Va. W10	6.5	+24	+4.75	+32.25	+14.75	+42.25	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Butler, Pa. F6	7.5	+23	+3	+30.5	+12.5	+40	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Fairless, Pa. N3	....	....	....	....	....	....	7.25	+12	10.25	+8	13.75	+3.5	16.25	+1.75
Fontana, Calif. K1	....	....	....	....	....	....	+3.75	+23	+0.75	+19	2.75	+14.5	5.25	+12.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	8.25	+11	11.25	+7	14.75	+2.5	17.25	+0.75
Lorain, O. N3	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Sharon, Pa. S4	7.5	+23	+3	+30.5	+12.5	+40	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Sparrows Pt., Md. B2	5.5	+25	+0.5	+32.5	+14.5	+42	7.25	+12	10.25	+8	13.75	+3.5	16.25	+1.75
Wheatland, Pa. W9	7.5	+23	+3	+30.5	+12.5	+40	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Youngstown R2, Y1	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Alton, Ill. L1	16.75	+0.75	17.25	+0.25	18.75	0.5	18.75	0.5	....	....	....	....
Benwood, W. Va. W10	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Etna, Pa. N2	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Fairless, Pa. N3	16.75	+0.75	17.25	+0.25	18.75	0.5	18.75	0.5	8.25	+10.5	8.25	+10.5
Fontana, Calif. K1	5.75	+11.75	6.25	+11.25	7.75	+10.5	7.75	+10.5	+2.75	+21.5	+2.75	+21.5
Indiana Harbor, Ind. Y1	17.75	0.25	18.25	0.75	19.75	1.5	19.25	1.5	9.25	+9.5	9.25	+9.5
Lorain, O. N3	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Sharon, Pa. M6	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Sparrows Pt., Md. B2	16.75	+0.75	17.25	+0.25	18.75	0.5	18.75	0.5	8.25	+10.5	8.25	+10.5
Wheatland, Pa. W9	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Youngstown R2, Y1	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	21.25	26.00	....	34.50	....	40.50	42.50	46.75	43.25
202	22.75	29.00	35.00	37.50	39.25	41.25	43.25	47.25	47.25
301	22.25	27.00	35.75	35.75	40.25	42.50	44.50	49.25	45.75
302	24.25	30.25	36.50	39.00	41.00	43.25	45.50	50.00	50.00
302B	24.50	31.50	39.25	44.00	43.25	45.50	47.50	54.75	54.75
303	....	30.75	39.50	....	44.00	46.25	48.00	54.50	54.50
304	26.00	32.00	39.00	42.50	43.75	46.00	48.75	53.25	53.25
304L	....	....	46.50	49.50	51.25	53.50	56.25	60.75	60.75
305	27.50	35.25	40.75	45.75	43.75	46.00	49.25	56.50	56.50
308	29.50	36.75	45.50	48.25	50.75	53.50	58.00	60.50	60.50
309	38.25	47.50	55.50	62.00	61.25	64.50	68.25	77.50	77.50
310	47.75	59.25	75.00	81.00	83.25	87.50	89.25	93.00	93.00
314	....	....	....	....	83.25	....	80.25	....	100.50
316	38.25	47.50	59.75	66.50	66.75	70.25	73.75	78.25	78.25
316L	....	....	67.25	73.00	74.25	77.75	81.25	85.75	85.75
317	46.25	57.75	73.75	84.75	83.00	87.25	90.00	97.00	97.00
321	31.00	38.50	45.25	51.50	50.50	53.25	57.50	63.00	63.00
18-8 CbTa	35.50	44.75	53.50	61.00	59.25	62.25	67.00	76.25	76.25
403	....	....	30.75	....	34.50	36.25	38.75	46.50	46.50
405	18.75	24.50	28.50	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	31.50	33.00	34.75	46.50	46.50
420	....	32.25	33.00	40.25	37.75	39.75	43.50	59.50	59.50
430	16.25	21.00	27.75	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	28.25	....	32.00	33.50	35.25	49.75	49.75
431	....	27.75	36.25	....	40.50	42.50	44.25	53.75	53.75
446	....	....	37.75	56.75	42.50	44.75	46.00	67.25	67.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U.S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U.S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates—Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	35.50
304	33.15	36.20	40.30	44.50	37.75
304-L	35.40	38.80	43.15	47.65	....
316	38.35	41.60	45.90	50.15	55.50
316-L	43.55	47.60	52.70	57.85	....
316-Cb	43.85	48.10	53.40	58.75	....
321	34.90	37.95	42.10	46.40	44.75
347	37.05	41.25	46.45	51.70	54.25
405	27.55	29.20	33.15	37.05	....
410	27.00	28.70	32.65	36.55	....
430	27.00	28.70	32.65	36.55	....
Inconel	47.28	57.90	68.50	79.20	....
Nickel	40.00	50.30	60.65	71.05	....
Nickel, Low Carbon	40.30	50.95	61.65	72.50	....
Monel	41.70	51.90	62.15	72.40	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.00	39.85

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	Cr Hot Work	0.45-0.495
Extra Carbon	0.345	W-Cr Hot Work	0.43-0.475
Special Carbon	0.41-0.45	V-Cr Hot Work	0.460
Oil Hardening	0.450	Hi-Carbon-Cr	0.830

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.170
18.25	4.25	1	4.75	....	2.385
18	4	2	9	....	2.755
18	4	2	....	....	1.845
18	4	1	....	....	1.680
9	3.5	..	....	....	1.275
13.5	4	3	....	....	1.945
13.75	3.75	2	5	....	2.325
6.4	4.5	1.9	....	5	1.185
6	4	3	....	6	1.430
1.5	4	1	....	8.5	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
AlabamaCity,Ala. R2	58.50	59.00	....	....
Birmingham R2	58.50	59.00‡	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward,Ala. W15	58.50**	59.00‡	63.00	....
Cincinnati, deld.	....	66.70	....	....
Buffalo District				
Buffalo H1, R2	64.50	65.00	65.50	66.00
Tonawanda,N.Y. W12	64.50	65.00	65.50	66.00
N.Tonawanda,N.Y. T9	....	65.00	65.50	66.00
Boston, deld.	75.79	76.29	76.79	....
Rochester,N.Y., deld.	67.52	68.02	68.52	....
Syracuse,N.Y., deld.	68.62	69.12	69.62	....
Chicago District				
Chicago I-3	64.50	65.00	65.00	65.50
S.Chicago,Ill. R2	64.50	....	65.00	....
S.Chicago,Ill. Y1	64.50	65.00	65.00	....
S.Chicago,Ill. W14	64.50	....	65.00	65.50
Milwaukee, deld.	66.96	67.46	67.46	67.96
Muskegon,Mich., deld.	....	78.83	78.83	....
Cleveland District				
Cleveland R2, A7	64.50	65.00	65.00	65.50
Akron,O., deld.	67.62	68.12	68.12	68.62
Mid-Atlantic District				
Birdsboro,Pa. B10	66.50	67.00	67.50	68.00
Chester,Pa. P4	66.50	67.00	67.50	....
Swedeland,Pa. A3	66.50	67.00	67.50	68.00
New York, deld.	....	73.20	73.70	....
Newark,N.J., deld.	70.52	71.02	71.52	72.02
Philadelphia, deld.	68.38	68.88	69.38	69.88
Troy,N.Y. R2	66.50	67.00	67.50	68.00
Pittsburgh District				
NevilleIsland,Pa. P6	64.50	65.00	65.00	65.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	66.45	66.45	66.98
McKeesRocks,Pa., deld.	....	66.10	66.10	66.63
Lawrenceville, Homestead, Wilmerding,Monaca,Pa., deld	....	66.76	66.76	67.29
Verona,Trafford,Pa., deld.	66.79	67.32	67.32	67.85
Brackenridge,Pa., deld.	67.10	67.60	67.60	68.13
Midland,Pa. C18	64.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Hubbard,O. Y1	....	....	65.00	....
Sharpsville,Pa. S6	64.50	....	65.00	65.50
Youngstown Y1	....	....	65.00	65.50
Mansfield,O., deld.	69.40	....	69.90	70.40
Duluth I-3	64.50	65.00	65.00	65.50
Erie,Pa. I-3	64.50	65.00	65.00	65.50
Everett,Mass. E1	*66.00*	*66.50*	*67.00*	....
Fontana,Calif. K1	70.50	71.00	....	....
Geneva,Utah C11	64.50	65.00	....	....
GraniteCity,Ill. G4	66.40	66.90	67.40	....
Ironton,Utah C11	64.50	65.00	....	....
Minnequa,Colo. C10	66.50	67.00	67.50	....
Rockwood,Tenn. T3	....	59.00‡	63.00	....
Toledo,O. I-3	64.50	65.00	65.00	65.50
Cincinnati, deld.	71.04	71.54	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.60%, $59.50.
‡Phos. 0.70-0.90%; Phos. 0.30-0.50%, $60.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extras; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	77.25
Buffalo H1	78.50

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity, Ky. P15	$105.50
NiagaraFalls,N.Y. P15	105.50
Keokuk,Iowa, Open-hearth & Fdry, freight allowed K2	110.00
Keokuk, H.O. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	113.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$78.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	78.50
Troy,N.Y. R2 (Phos. 0.035% max)	72.50
Philadelphia, deld.	80.26
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	69.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	69.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	69.50
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	69.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Houston, Seattle no charge.

	SHEETS				STRIP	BARS			Standard Structural	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††‡	Shapes	Carbon	Floor
Atlanta	8.17§	9.37§	9.83§	....	8.21	8.45	10.23	....	8.59	8.55	10.51
Baltimore	7.88	8.98	9.12	....	8.36	8.53	9.13[3]	14.68	8.75	8.26	9.76
Birmingham	7.80	9.00	9.52	....	7.82	8.07	10.12	....	8.20	8.16	10.31
Boston	8.84	9.88	11.06	60.42	8.89	9.07	....	14.69	9.10	9.18	10.68
Buffalo	7.85	9.00	10.75	....	8.05	8.25	8.70	14.50	8.50	8.50	10.05
Chattanooga	7.99	9.24	9.10	....	8.00	8.24	10.04	....	8.44	8.40	10.26
Chicago	7.80	9.00	9.70	53.25	7.82	8.07	8.35	14.15	8.20	8.16	9.49
Cincinnati	7.94	9.05	9.75	50.00	8.14	8.38	8.84	14.46	8.74	8.52	9.78
Cleveland	7.78	8.98	9.60	53.43	7.92	8.16	8.60	14.24	8.57	8.39	9.72
Denver	9.55	11.09	12.41	....	9.70	9.75	10.54	18.89	9.60	9.50	11.15
Detroit	8.03	9.25	10.05	59.50	8.17	8.37	8.70	14.41	8.74	8.51	9.74
Erie, Pa.	7.85	9.00	9.60[10]	....	7.95	8.20	8.70[10]	....	8.50	8.35	9.75
Houston	8.70	9.65	10.99	....	8.80	9.15	10.55	15.00	8.90	8.60	10.10
Jackson, Miss.	8.09	9.34	9.79	....	8.16	8.41	10.23	....	8.54	8.50	10.34
Los Angeles	9.10	10.80	11.65	57.45	9.15	9.05	12.10	15.50	9.15	9.65	11.80
Milwaukee	7.93	9.13	9.83	....	7.95	8.20	8.58	14.28	8.41	8.29	9.62
Moline, Ill.	8.05	9.25	10.05	....	8.13	8.26	8.70	....	7.78	8.36	...
New York	8.45	9.66	10.23	60.20	8.90	9.01	....	14.59	8.91	9.01	10.31
Norfolk, Va.	8.05	...	....	....	8.55	8.60	10.80	....	8.95	8.45	9.95
Philadelphia	8.15	9.07	10.29	50.69	8.82	8.71	9.31	14.51	8.70	8.68	9.70
Pittsburgh	7.78	8.99	10.05	50.00	7.92	8.07	8.35	14.15	8.20	8.16	9.49
Portland, Oreg.	8.90	9.65	11.40	55.20	11.05‡‡	9.35	13.80	14.60	9.35	12.20§§	11.60
Richmond, Va.	8.00	...	10.14	....	8.55	8.40	10.00	....	8.95	8.40	9.90
St. Louis	8.14	9.34	10.06	73.36	8.19	8.43	8.96	14.51	8.67	8.52	9.86
St. Paul	8.29	9.49	10.31	....	8.43	8.52	9.21	....	8.94	8.90	9.87
San Francisco	8.95	10.30	10.80	53.45	8.95	9.05	12.30	15.50	9.05	9.20	11.45
Seattle	9.55	10.70	11.65	55.20	9.55	9.50	13.40	15.85	9.35	9.30	11.70
Spokane, Wash.	9.55	10.70	11.65	....	9.55	9.50	13.40	16.60	9.35	9.30	11.70
Washington	8.48	9.58	....	....	9.06	9.13	9.73	....	9.35	8.86	10.36

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; §42 in. and under; **⅛-in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [3]—400 to 999 lb; [8]—1000 to 1999 lb; [8]—2000 to 3999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beach Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $135; Salina, Pa., $140; Niles, O., $138; Cutler, Utah, $165.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $175; Stevens Pottery, Ga., $185; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $150; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $155; E. Chicago, Ind., Joliet, Rockdale, Ill., $160; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; E. Chicago, Ind., $167; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Woodbridge, N. J., $128; Philadelphia, $130.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $100; Clearfield, Pa., Portsmouth, O., $102.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $95; Danville, Ill., $298; Philadelphia, Clearfield, Pa., $230; Orviston, Pa., $245.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $298; Philadelphia, Clearfield, Pa., Orviston, Pa., $305.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $338; Philadelphia, Clearfield, Pa., Orviston, Pa., $345.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reasdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $16; Thornton, McCook, Ill., $16.35; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ½-in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜-in. grains with fines: Baltimore, $72.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-39; 70%, $35-36; 60%, $31-32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old range bessemer	11.85
Old range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	27.00-27.50
N. African hematite (spot)	nom. 24.00-25.00
Brazilian iron ore, 68-69%	35.00-36.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$24.00-26.00
Domestic, concentrates, mine	55.00

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.60-1.70 per long ton unit, c.i.f. U.S. ports, duty for buyer's account; other than Indian, $1.45-1.50; contracts by negotiation.

Chrome Ore

Gross ton f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$54.00-57.00
48% 2.8:1	51.00-54.00
48% no ratio	43.00-45.00

South African Transvaal

48% no ratio	$37.50-39.00
44% no ratio	26.00-27.00

Turkish

48% 3:1	$60.00-63.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked $1.18

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$3.20-3.65
60-65%	3.60-3.80

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

Sponge iron:	Cents
Swedish, c.i.f. Camden, N.J., c.l. in bags	8.50
Domestic:	
F.o.b., Johnstown, Pa., Niagara Falls, N. Y., in bags	9.50
F.o.b., Riverton, N. J., in bags	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	26.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+ % Fe)	34.00
Unannealed (99+ % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)	29.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, 99.00-290.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb drum, frght allowed	
Carlots	38.20
Ton lots	40.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	35.80-45.00†
Bronze, 5000-lb lots	44.70-59.00†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.065
Nickel-Silver, 5000-lb lots	54.70-66.40†
Phosphor-Copper, 5000-lb lots	64.00
Copper (atomized) 5000-lb lots	46.50-54.00‡
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.08
Stainless Steel, 316	$1.44
Tin	14.50*
Zinc, 5000-lb lots	19.75-33.00‡
Tungsten:	Dollars
Melting grade, 99% 60 to 2000 mesh:	
1000 lb and over	4.20
Less than 1000 lb.	4.35
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

——Inches—— Diam.	Length	Per 100 lb
2	24	$57.75
2½	30	37.25
3	40	35.25
4	40	33.25
5⅛	40	33.00
6	60	30.00
7	60	26.75
8, 9, 10	60	26.50
12	72	25.50
14	60	25.50
16	72	24.50
17	60	25.50
18	72	24.50
20	72	24.00
24	84	24.75

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.75-15.75
Connellsville, foundry	17.50-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	33.78
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, deld.	32.25
Saginaw, deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, O., ovens	29.00
Cincinnati, deld.	29.27
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Painesville, O., ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
Neville Island (Pittsburgh), Pa., ovens	29.25
St. Paul, ovens	29.75
Chicago, deld.	33.14
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$7.15	$7.15	$7.15	$7.40
Bar Size Angles	7.11	7.11	7.11	7.26
Structural Angles	7.30	7.30	7.30	7.60
I-Beams	7.50	7.50	7.50	7.75
Channels	7.70	7.70	7.70	7.95
Plates (basic bessemer)	9.00	9.00	9.00	9.30
Sheets, H.R.	8.55	8.55	8.55	8.85
Sheets, C.R. (drawing quality)	8.95	8.95	8.95	9.35
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	27.17	27.17	27.17	27.64
Barbed Wire (†)	6.90	6.90	6.90	7.35
Merchant Bars	7.15	7.15	7.15	7.50
Hot-Rolled Bands	7.25	7.25	7.25	7.65
Wire Rods, Thomas Commercial No. 5	6.38	6.38	6.38	6.78
Wire Rods, O-H Cold Heading Quality No. 5	6.72	6.72	6.72	7.12
Bright Common Wire Nails (‡)	8.45	8.45	8.45	8.57
Oil Country Pipe: Mills withdrawn temporarily.				

†Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx). Base price per net ton; $255, Johnstown, Duquesne, Sheridan, Pa., Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74% respectively.

(Mn 79-81%). Lump $263 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max, 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 33c; 2000 lb to min carload, 35c; 500 lb to 1999 lb, 37c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk, 27.75c per lb of contained Cr; c.l. packed 29.3c, ton lot 31.05c; less ton 32.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 34.75c per lb contained Cr, 0.02% max 41.5c, 0.03% max 41c, 0.06% max 39.5c, 0.1% max 39c, 0.15% max 38.75c, 0.2% max 38.5c, 0.5% max 38.25c, 1.0% max 37.5c, 1.5% max 37.35c, 2.0% max 37.25c. Ton lot, add 3.4c, less ton add 5.1c. Carload packed add 1.75c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 29.05c per lb contained Cr. Packed, c.l. 30.65c, ton 32.45c, less ton 33.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8 M x D, 20.85c, per lb of alloy, ton lot 22.10c; less ton lot 23.3c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 41.35c per lb of contained Cr; 1" x down, bulk 42.35c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.29 per lb, ton lot $1.31, less ton lot $1.33. Delivered. Spot, add 5c

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 13c per lb of contained Si. Packed c.l. 15.5c, ton lot 16.95c, less ton 18.6c, f.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per pound contained silicon. Packed, c.l. 17.25c, ton lot, 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5%-1.9%). Ton lot, 45c per lb; less than ton lot, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carload 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3½ lb each and containing 2 lb of Cr). Contract, carload, bulk, 19c per lb of briquet, carload packed in box pallets 19.2c, in bags 20.1c; 3000 lb to c.l. in box pallets 20.4c; 2000 lb to c.l. in bags, 21.3c; less than 2000 lb in bags 22.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, pallets 15c, bags 16c; 3000 lb to c.l., pallets 16.2c; 2000 lb to c.l. bags, 17.2c, less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, pallets, 15.3c; bags 16.3c, 3000 lb to c.l., pallets, 16.5c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si). Contract, carload, bulk, 7.7c per lb of briquet, packed, pallets, 7.9c; bags 8.9c; 3000 lb to c.l., pallets 9.5c; 2000 lb to c.l. bags 10.5c; less ton 11.4c. Delivered. Spot, add 0.25c. (Small size—weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 7.85c. Packed, pallets 8.05c; bags 9.05c; 3000 lb to c.l. pallets 9.65c; 2000 lb to c.l. bags 10.65c; less ton 11.55c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $3.15 per lb of contained W; 2000 lb W to 5000 lb W, $3.25; less than 2000 lb W, $3.37. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot. 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx, Ta 20% approx., and Cb plus Ta 60% min, C 0.30% max). Ton lot 2" x D, $4.95 per lb of contained Cb plus Ta, delivered; less ton lot $5.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, c.l. packed ½-in. x 12 M 19c per lb of alloy, ton lot 20.15c, less ton 21.4c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5.7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lot 20.15c; less ton lot 21.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lot 19.55c; less ton lot 20.8c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works. Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.

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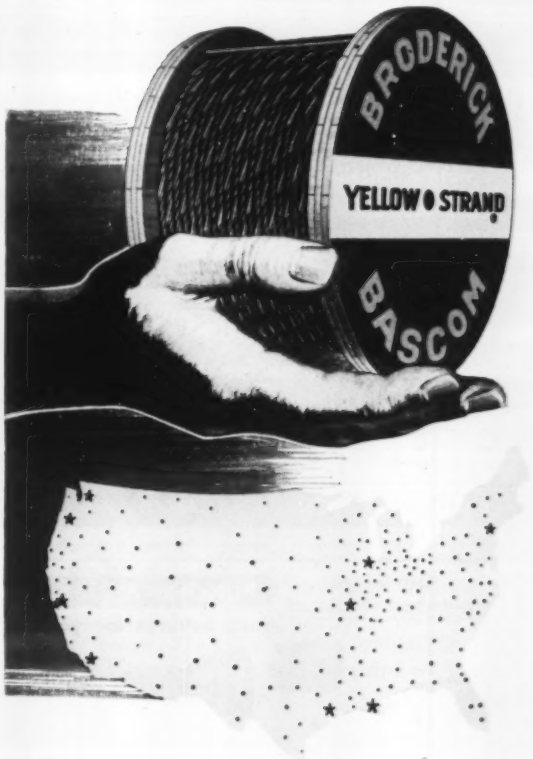

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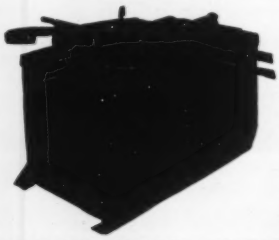

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Scrap Price Downtrend Continues

Slackening steelmaking operations contribute to the sluggish demand for open-hearth grades of scrap. Composite on the prime grades slips another 66 cents to $47.67

Scrap Prices, Page 154

Washington — As expected (STEEL, Mar. 11, p. 105), the freeze on exports of heavy melting steel scrap is over. The Commerce department is processing all applications for the export of all grades of iron and steel scrap. Late in February export licensing was temporarily suspended to permit a study of the situation. Later licensing was renewed except on the heavy melting grade. This latest move restores licensing to heavy melting.

The action follows discussions with Japan, the United Kingdom and the European Coal & Steel Community. In these talks, the Commerce department was warned these countries' steel plants would soon have to cut operations because of a scrap shortage. The Commerce department thinks domestic supplies are adequate.

Pittsburgh—An independent mill purchased a large tonnage of No. 2 heavy melting scrap for $38 and No. 2 bundles for $36 last week. This represented a decline of $4 per ton for No. 2 heavy melting and a drop of $2 for the bundles. This purchase and a $2 decline in the price paid for cut structurals again emphasized the continuing weakness of the local market. No new purchases of No. 1 heavy melting scrap were reported. With prices of other grades declining, price of No. 1 heavy melting is off, although the quotation is nominal. Brokers are paying an average of $46 per ton for that grade.

Philadelphia — Prices have declined further, with demand slow and yard accumulations increasing. Prime grades of open-hearth material are off, nominally, to $52, delivered. No. 2 heavy melting steel (at $42) and No. 2 bundles (at $40) are lower.

Electric furnace bundles have declined $3, now being quoted $54, delivered. Heavy turnings are $2 lower at $48, on a nominal basis.

Detroit—While prices are unchanged, scrap brokers here anticipate a further decline—possibly next week. Dealers are pinning their hopes on continued heavy buying from the Hamilton, Ont., mills.

Cleveland—Scrap prices continue to slide to lower levels here

(*Please turn to page* 160)

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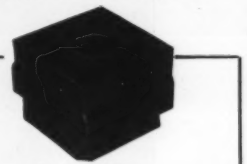

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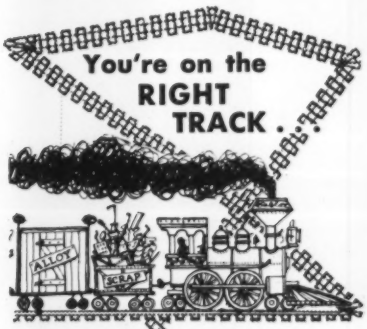

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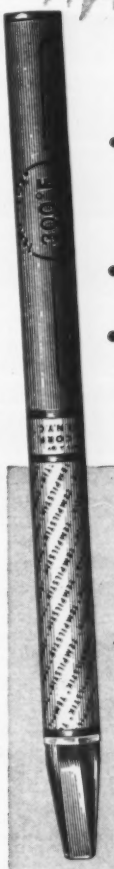

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Mar. 27, 1957. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Mar. 27	$47.67
Mar. 20	48.83
Feb. Avg	53.41
Mar. 1956	50.21
Mar. 1952	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*46.00-47.00*
No. 2 heavy melting	*37.00-38.00*
No. 1 bundles	*46.00-47.00*
No. 2 bundles	*35.00-36.00*
No. 1 busheling	*46.00-47.00*
Machine shop turnings	*33.00-34.00*
Mixed borings, turnings	*33.00-34.00*
Short shovel turnings	*37.00-38.00*
Cast iron borings	*37.00-38.00*
Cut structurals, 3 ft. lengths	*52.00-53.00*
Cut structurals, 2 ft. and under	*54.00-55.00*
Heavy turnings	*42.00-43.00*
Punchings & plate scrap	*52.00-53.00*
Electric furnace bundles	*52.00-53.00*

Cast Iron Grades

No. 1 cupola	48.00-49.00
Heavy breakable cast	46.00-47.00
Unstripped motor blocks	38.00-39.00
No. 1 machinery cast	57.00-58.00

Railroad Scrap

No. 1 R.R. heavy melt.	*53.00-54.00*
Rails, 2 ft and under	70.00-71.00
Rails, 18 in. and under	71.00-72.00
Rails, random lengths	67.00-68.00
Railroad specialties	67.00-68.00

Stainless Steel Scrap

18-8 bundles & solids	*400.00-425.00*
18-8 turnings	*300.00-325.00*
430 bundles & solids	90.00-100.00
430 turnings	65.00-70.00

CLEVELAND

No. 1 heavy melting	*41.00-42.00*
No. 2 heavy melting	*36.00-37.00*
No. 1 bundles	*41.00-42.00*
No. 2 bundles	*33.00-34.00*
No. 1 busheling	*41.00-42.00*
Machine shop turnings	*24.00-25.00*
Mixed borings, turnings	*27.00-28.00*
Short shovel turnings	*27.00-28.00*
Cast iron borings	*27.00-28.00*
Cut foundry steel	49.00-50.00
Cut structurals, plates 2 ft and under	*51.00-52.00*
Alloy free, short shovel turnings	*31.00-32.00*
Electric furnace bundles	*42.00-43.00*

Cast Iron Grades

No. 1 cupola	*50.00-51.00*
Charging box cast	*39.00-40.00*
Heavy breakable cast	*39.00-40.00*
Stove plate	*46.00-47.00*
Unstripped motor blocks	*32.00-33.00*
Brake shoes	*39.00-40.00*
Clean auto cast	*49.00-50.00*
Burnt cast	*37.00-38.00*
Drop broken machinery	*52.00-53.00*

Railroad Scrap

No. 1 R.R. heavy melt.	49.00-50.00
R.R. malleable	57.00-58.00
Rails, 2 ft and under	70.00-71.00
Rails, 18 in. and under	71.00-72.00
Rails, random lengths	65.00-66.00
Cast steel	59.00-60.00
Railroad specialties	63.00-64.00
Uncut tires	62.00-63.00
Angles, splice bars	62.00-63.00
Rails, rerolling	71.00-72.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	*330.00-340.00*
18-8 turnings	*230.00-240.00*
430 clips, bundles, solids	75.00-80.00
430 turnings	*40.00-50.00*

YOUNGSTOWN

No. 1 heavy melting	*44.00-45.00*
No. 2 heavy melting	*40.00-41.00*
No. 1 bundles	*44.00-45.00*
No. 2 bundles	*36.00-37.00*
No. 1 busheling	*44.00-45.00*
Machine shop turnings	*23.00-24.00*
Short shovel turnings	*23.00-24.00*
Cast iron borings	*23.00-24.00*
Low phos.	48.00-49.00
Electric furnace bundles	*47.00-48.00*

Railroad Scrap

No. 1 R.R. heavy melt.	50.00-51.00

CHICAGO

No. 1 hvy melt, indus.	*46.00-47.00*
No. 1 hvy melt., dealer	42.00-43.00
No. 2 heavy melting	39.00-40.00
No. 1 factory bundles	*47.00-48.00*
No. 1 dealer bundles	44.00-45.00
No. 2 bundles	37.00-38.00
No. 1 busheling, indus.	*46.00-47.00*
No. 1 busheling, dealer	42.00-43.00
Machine shop turnings	*27.00-28.00*
Mixed borings, turnings	*29.00-30.00*
Short shovel turnings	*29.00-30.00*
Cast iron borings	*29.00-30.00*
Cut structurals, 3 ft.	*50.00-51.00*
Punchings & plate scrap	*51.00-52.00*

Cast Iron Grades

No. 1 cupola	*41.00-42.00*
Stove plate	*39.00-40.00*
Unstripped motor blocks	*31.00-32.00*
Clean auto cast	*47.00-48.00*
Drop broken machinery	*47.00-48.00*

Railroad Scrap

No. 1 R.R. heavy melt.	49.00-50.00
R.R. malleable	*55.00-56.00*
Rails, 2 ft and under	*59.00-60.00*
Rails, 18 in. and under	*60.00-61.00*
Angles, splice bars	*55.00-56.00*
Rails, rerolling	59.00-60.00

Stainless Steel Scrap

18-8 bundles & solids	*380.00-390.00*
18-8 turnings	*280.00-290.00*
430 bundles & solids	95.00-100.00
430 turnings	55.00-60.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	40.00-41.00
No. 2 heavy melting	30.00-31.00
No. 1 bundles	40.00-41.00
No. 2 bundles	29.00-30.00
No. 1 busheling	40.00-41.00
Machine shop turnings	26.00-27.00
Mixed borings, turnings	27.00-28.00
Short shovel turnings	27.00-28.00
Punchings & plate scrap	52.00-53.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	43.00
Stove plate	45.00
Heavy breakable	41.00
Unstripped motor blocks	29.00
Clean auto cast	52.00
Malleable	53.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*43.50*
No. 2 heavy melting	*41.00*
No. 1 bundles	*43.50*
No. 2 bundles	*35.00*
No. 1 busheling	*43.50*
Machine shop turnings	*28.00*
Short shovel turnings	*30.00*

Cast Iron Grades

No. 1 cupola	45.50
Charging box cast	40.00
Heavy breakable cast	40.00
Unstripped motor blocks	*38.00*
Brake shoes	*44.00*
Clean auto cast	48.50
Stove plate	40.00

Railroad Scrap

No. 1 R.R. heavy melt.	*46.50*
Rails, 18 in. and under	63.00
Rails, rerolling	*60.00*
Rails, random lengths	*56.00*
Angles, splice bars	*58.00*

PHILADELPHIA

No. 1 heavy melting	*52.00†*
No. 2 heavy melting	*42.00*
No. 1 bundles	*52.00†*
No. 2 bundles	*40.00*
No. 1 busheling	*52.00†*
Electric furnace bundles	*54.00*
Mixed borings, turnings	43.00
Short shovel turnings	45.00
Machine shop turnings	40.00-41.00
Heavy turnings	*48.00†*
Structurals & plate	58.00-59.00
Couplers, springs, wheels	63.00
Rail crops, 2 ft & under	*69.00-71.00*

Caste Iron Grades

No. 1 cupola	*46.00*
Heavy breakable cast	56.00
Malleable	64.00†
Drop broken machinery	55.00-56.00

†Nominal.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*45.00-46.00*
No. 2 heavy melting	*37.00-38.00*
No. 1 bundles	*45.00-46.00*
No. 2 bundles	*33.00-35.00*
Machine shop turnings	*28.00-29.00*
Mixed borings, turnings	*30.00-31.00*
Short shovel turnings	*33.00-34.00*
Low phos. (structurals & plate)	*51.00-52.00*

Cast Iron Grades

No. 1 cupola	*41.00-42.00*
Unstripped motor blocks	*33.00-34.00*
Heavy breakable	46.00-47.00

Stainless Steel

18-8 sheets, clips solids	*360.00-370.00*
18-8 borings, turnings	*260.00*
430 sheets, clips, solids	*80.00-90.00*
410 sheets, clips, solids	*70.00-80.00*

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*40.00-41.00*
No. 2 heavy melting	33.00-34.00
No. 1 bundles	*40.00-41.00*
No. 2 bundles	31.00-32.00
No. 1 busheling	*40.00-41.00*
Machine shop turnings	*25.00-26.00*
Mixed borings, turnings	28.00-29.00
Short shovel turnings	*29.00-30.00*
No. 1 cast	38.00-39.00
Mixed cupola cast	36.00-37.00
No. 1 machinery cast	44.00-45.00

BUFFALO

No. 1 heavy melting	48.00-49.00
No. 2 heavy melting	42.00-43.00
No. 1 bundles	48.00-49.00
No. 2 bundles	39.00-40.00
No. 1 busheling	48.00-49.00
Mixed borings, turnings	34.00-35.00
Machine shop turnings	31.00-32.00
Short shovel turnings	35.00-36.00
Cast iron borings	34.00-35.00
Low phos.	51.00-52.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	43.00-44.00
No. 1 machinery	47.00-48.00

Railroad Scrap

Rails, random length	57.00-58.00
Rails, 3 ft and under	62.00-63.00
Railroad specialties	52.00-53.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*43.00-44.00*
No. 2 heavy melting	*36.50-37.50*
No. 1 bundles	*43.00-44.00*
No. 2 bundles	*32.50-33.50*
No. 1 busheling	*43.00-44.00*
Machine shop turnings	*30.00-31.00*
Mixed borings, turnings	*30.00-31.00*
Short shovel turnings	*32.50-33.50*
Cast iron borings	*30.00-31.00*
Low phos. 18 in.	53.00-54.00

Cast Iron Grades

No. 1 cupola	*44.00-45.00*
Heavy breakable cast	*45.00-46.00*
Charging box cast	*45.00-46.00*
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	*46.00-47.00*
Rails, 18 in. and under	67.00-68.00
Rails, random lengths	57.00-58.00

BIRMINGHAM

No. 1 heavy melting	*41.00-42.00*
No. 2 heavy melting	*36.00-37.00*
No. 1 bundles	*41.00-42.00*
No. 2 bundles	*24.00-25.00*
No. 1 busheling	*41.00-42.00*
Cast iron borings	26.00-27.00
Short shovel turnings	35.00-36.00
Machine shop turnings	33.00-34.00
Bar crops and plate	*50.00-51.00*
Structurals & plate	*49.00-50.00*
Electric furnace bundles	48.00-49.00
Electric furnace, 2 ft & under	46.00-47.00

(F.o.b. shipping point)

Cast Iron Grades

No. 1 cupola	*48.00-49.00*
Stove plate	*47.00-48.00*
Unstripped motor blocks	*38.00-39.00*
Charging box cast	*37.00-38.00*
No. 1 wheels	*37.00-38.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*57.00-58.00*
Rails, 18-in. and under	58.00-59.00
Rails, rerolling	*60.00-61.00*
Rails, random lengths	*50.00-51.00*
Angles, splice bars	*55.00-56.00*

SEATTLE

No. 1 heavy melting	53.00
No. 2 heavy melting	48.00
No. 1 bundles	48.00
No. 2 bundles	30.00-32.00
Machine shop turnings	33.00-35.00
Mixed borings, turnings	33.00-35.00
Electric furnace No. 1	62.00-65.00

Cast Iron Grades

No. 1 cupola	*50.00-52.00*
Heavy breakable cast	48.00-50.00
Unstripped motor blocks	*40.00-41.00*
Stove plate (f.o.b. plant)	*42.00*

LOS ANGELES

No. 1 heavy melting	55.00
No. 2 heavy melting	51.00
No. 1 bundles	54.00
No. 2 bundles	36.00
Machine shop turnings	36.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	60.00

SAN FRANCISCO

No. 1 heavy melting	55.00
No. 2 heavy melting	50.00
No. 1 bundles	54.00
No. 2 bundles	38.00
Machine shop turnings	35.00
Mixed borings, turnings	35.00
Cast iron borings	35.00
Heavy turnings	35.00
Short shovel turnings	37.00
Cut structurals, 3 ft	63.00

Cast Iron Grades

No. 1 cupola	57.00
Charging box cast	47.00-49.00
Stove plate	48.00
Heavy breakable cast	42.00
Unstripped motor blocks	50.00
Clean auto cast	57.00
No. 1 wheels	50.00
Drop broken machinery	57.00

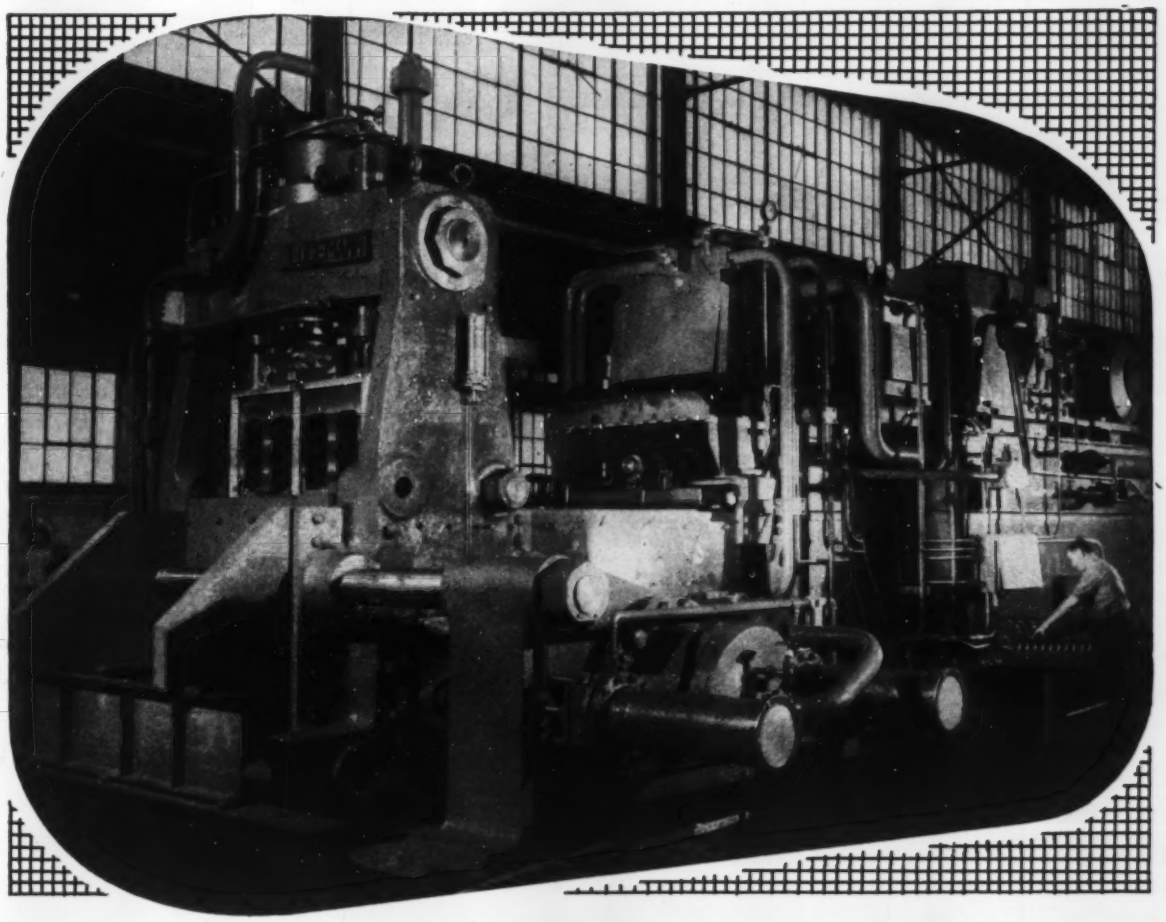
HAMILTON, ONT.

No. 1 heavy melting	48.00
No. 2 heavy melting	43.00
No. 1 bundles	48.00
No. 2 bundles	37.00
Mixed steel scrap	40.00
Mixed borings, turnings	24.00
Busheling, new factory: Prepared	46.00
Unprepared	42.00
Short steel turnings	33.00
Rails, rerolling	54.00

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b., Hamilton, Ont.



A New LOGEMANN *Triple Compression* METAL BALING PRESS

★ COMPLETELY AUTOMATIC ★ MINIMUM INSTALLATION COST ★ TOP FILL
★ BOTTOM DISCHARGE CLEANS BOX EVERY BALE ★ RECORDS SHOW A 50 TO 55 TON SUSTAINED HOURLY OUTPUT OF HIGH DENSITY BALES

To meet the demands of modern automobile and body plants for automation, LOGEMANN has installed a number of these new type scrap presses for baling unprecedented tonnages of steel sheet-scrap. This unit can be adapted to other types of plants and other sheet metals with some modifications to suit the conditions and requirements of the user.

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Second Quarter Holds Key

If a peak year is in the books, nonferrous sales will have to mushroom during this period. Metals men watch inventories, stockpile for clues. Prices remain firm

Nonferrous Metal Prices, Pages 158 & 159

THE SECOND quarter will be crucial for nonferrous metals.

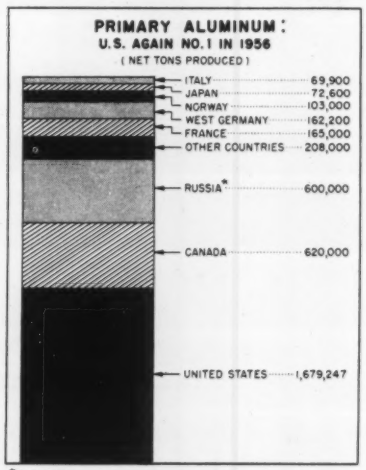
1. User inventories will be at low levels.

2. The construction, automotive and appliance industries will "burst forth" or show the first concrete signs of an average sales year.

3. Congressional appropriation committees may determine the fate of stockpile purchasing programs.

Copper—The fat has been pared from fabricators' stocks. Primary producers' stocks have grown but are not out of hand. Day-by-day sales are showing moderate improvement. Foreign sales (based on the average price of foreign market quotations) have helped interested producers keep inventories in balance. The stage is set for a good second quarter. Automotive production holds one of the keys to a successful performance. Wire and cable demand will continue to bolster the market. Price trend: Look for primary producers to hold the line, if possible, at 32 cents per pound. Secondary red metal makers will stay about a cent under the primary price during the second quarter.

Lead, Zinc—Substantial amounts of these metals have been offered to the General Services Administration for May 15 delivery. Observers point out that while they know only part of the amount offered will be accepted, the industry is attempting to point out to the government that it needs federal assistance if the prices of lead (16 cents a pound) and zinc (13.50 cents a pound) are to stay at present levels. Economy minded congressional leaders may be more impressed with the tonnages already stockpiled rather than the need for GSA to support the industry. Second quarter outlook: 1. Lead sales should parallel those of last year's second quarter. Lead for tetraethyl lead, cable and batteries will keep sales on a high plateau. 2. Zinc sales should top first quarter results. Diecasters supplying automotive and appliance demands will make the difference between a strong and an average three-month period. Zinc for galvanizing should hold at peak levels if the spring rush for galvanized products materializes.



* Estimated.
Source: Aluminium Ltd.

Aluminum—With an average of about 40 lb going into each American automobile, second quarter automotive production will be of prime importance to aluminum. Two of its most important markets, building and transportation, are going to have to show marked improvement in the second quarter if 1957 is to be a record or near record year.

Titanium — Shipments of mill products will be at all-time highs during the year. The second quarter will be no exception as titanium mills operate at capacity.

Tin Users Stunned

The International Tin Committee boosted its "may" buying price for buffer stocks from slightly over 90 to 97.50 cents a pound. This means that the buffer stock manager has an option to purchase any tin which comes on the market at or below the 97.50 cent quotation. He "must" buy at 91.25 cents. The tin committee's old must-buy price was 80 cents. Domestic users are stunned. They point out that little can be done because it will take a presidential order (and it must be based on an emergency declaration) to get any stockpiled tin to help break the market. Result: Tin prices may be held at artifically high levels. Current price: About $1.02. Look for users who have been petitioning GSA to start a steady barrage of protests.

Copper Leader Worried

Roy H. Glover, chairman, Anaconda Co., reports: "It is fairly evident that users have looked to inventories for about 25 per

NONFERROUS PRICE RECORD

	Price Mar. 27	Last Change	Previous Price	Feb. Avg.	Jan. Avg.	Mar., 1956 Avg.
Aluminum ..	27.10	Aug. 10, 1956	25.90	27.100	27.100	24.650
Copper	30.50–32.00	Mar. 25, 1957	31.00–32.00	32.863	35.433	49.727
Lead	15.80	Jan. 13, 1956	16.30	15.800	15.800	15.800
Magnesium .	35.25	Aug. 13, 1956	33.75	35.250	35.250	32.500
Nickel	74.00	Dec. 6, 1956	64.50	74.000	70.880	64.500
Tin	101.125	Mar. 26, 1957	101.75	101.159	101.480	100.606
Zinc	13.50	Jan. 6, 1956	13.50	13.500	13.500	13.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

cent of their monthly requirements since last September . . . our information is that in many places inventories are becoming dangerously low."

Mr. Glover is ready to do battle with copper men who estimate that some 90 per cent of U.S. copper output can be produced profitably at 25 cents a pound or less. He reports: Based on 1956 U.S. production, 150,965 tons (13.9 per cent) cost 30 cents a pound or higher to produce; 245,484 tons (22.6 per cent) cost 29 cents or more; 359,451 tons (33.1 per cent) cost 25 cents a pound or more.

"The production with costs at 29 cents a pound and higher and representing 22.6 per cent of our domestic production is indispensable to our economy. Nevertheless, on the basis of present prices there is not a sufficient margin of profit in this production to justify mining risks."

Concludes Mr. Glover: "We have already ceased copper production in our Belmont mine (600 tons a month) and are in process of suspending production at our Mountain Consolidated mine (1400 tons a month). This action is taken not because of ore depletion, but because we have concluded that we can more profitably employ present manpower in development work for the future when copper prices will again be attractive for such high cost properties."

Predicts Aluminum Growth

R. L. Sheneman, manager, Business Analysis & Market Planning Department, Kaiser Aluminum & Chemical Sales Inc., predicts: "We expect aluminum shipments to rise 5 to 10 per cent during 1957. The building industry is expected to continue to be our leading market. Direct defense applications will steadily decline in relative importance in the future (barring war). Transportation is expected to grow rapidly, possibly rival the building industry as aluminum's most important market in the future. Among all our growth markets, electrical applications may increase the fastest."

Mr. Sheneman further predicted that demand for aluminum will more than double over the next decade to the level of about 4.2 million tons by 1965.

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Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots 27.10; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 241, 30.50; No. 356, 28.90, 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.
Cobalt: 97-99%, $2.35 per lb for 550-lb keg; $2.37 per lb for 100-lb case; $2.42 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 32.00 deld. Conn. valley; 32.00 deld. Midwest; custom smelters, 30.50-31.00 deld.; lake, 32.00 deld.; fire refined, 31.75 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U.S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

Lithium: 98+%, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00, f.o.b. Velasco, Tex. 13 in. sticks, 59.00, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91B (diecasting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-$257 per 76-lb flask.

Molybdenum: Extruded ingot, $9.60 per pound, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot or ingots for addition to cast iron, 74.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01.
Osmium: $80-$100 per troy oz, nom.

Palladium: $23-$24 per troy oz.

Platinum: $92-$95 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $12-$15 per lb.

Silver: Open market, 91.375 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.65 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 101.125; prompt, 101.00.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.), $2.75; grade A-2 (0.5% Fe max.), $2.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.00 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $4.75.
Zinc: Prime Western, 13.50; brass special, 13.75; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 14.85; special high grade, 15.25 deld. Die casting alloy ingot No. 3, 17.50; No. 2, 18.50; No. 5, 18.00 deld.
Zirconium: Ingots, commerical grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commerical grade, $10 per lb; reactor grade, $14-$22 per lb depending on quantity. Powder electronics grades, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 22.50-29.25; No. 12 foundry alloy (No. 2 grade), 22.50-23.50; 5% silicon alloy, 0.60 Cu max., 24.75-26.00; 13 alloy, 0.60 Cu max., 24.75-26.00; 195 alloy, 24.50-26.75; 108 alloy, 22.50-23.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 22.00; grade 3, 21.00; grade 4, 20.25.
Brass Ingot: Red brass, No. 115, 31.50; tin bronze, No. 225, 40.50; No. 245, 35.50; high-leaded tin bronze, No. 305, 35.50; No. 1 yellow, No. 405, 25.25; manganese bronze, No. 421, 28.50.
Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.83-$1.86, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.80, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 37.355; l.c.l., 37.98. Weatherproof, 30,000-lb lots, 37.78; l.c.l., 38.53. Magnet wire deld., 15,000 lb or more, 44.68; l.c.l., 45.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $11.00-$14.75; sheared mill plate, $9.25-$11.25; wire, $8.50-$11.00; forging billets, $6.85-$7.10; hot-rolled and forged bars, $7.10-$7.35.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $20.35; H.R. strip, $23.95; C.R. strip, $32.00; forged or H.R. bars, $18.40; wire, 0.015 in., 8.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheet and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed).

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.249-0.138	40.90-45.40	....
0.135-0.096	41.40-46.50	37.70-39.60
0.095-0.077	42.10-48.30	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.50
0.047-0.038	43.90-55.60	38.60-42.90
0.037-0.030	44.30-50.00	40.40-44.70
0.029-0.024	44.90-52.40	41.00
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.60-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-50.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.03
0.007	56.50	51.80
0.006	58.10	53.20

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.3	45.6
3004-F	42.3	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.0
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*24-48 in. widths or diam., 72-180 lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	63.00	60.40	....	....
0.188	63.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.313	59.70	57.20	....	69.60
0.344	58.50	....	....	....
Cold-Finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	66.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	56.10
1.125-1.500	55.20	53.90	59.00	56.10
Rolled				
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.60	....	....
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

Forging Stock: Round, Class 1, 43.30-55.90 in specific lengths 36-144 in., diam. 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick, width 0.0750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size in.)	
⅜	$18.45	2	$ 57.00
1	29.00	4	157.20
1¼	39.25	6	281.65
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	43.10-44.60	57.80-61.80
12-14	43.40-44.80	58.40-62.70
15-17	43.60-45.40	59.60-64.30
18-20	44.10-45.80	61.50-66.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.0 in., 93.30. Thread plate, .188 in., 71.70; .250-2.0 in., 70.60. Tooling plate, .250-3.0 in., 73.0.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)
Aluminum: 1100 clippings, 13.00-13.50; old sheets, 8.00-8.50; borings and turnings, 6.00-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	54.13b	51.36c	....	54.32	28.000	28.000	27.250
Yellow Brass	47.52	37.69d	48.06	50.43	21.875	21.625	20.125
Low Brass, 80%	50.20	50.14	50.74	53.01	24.250	24.000	23.500
Red Brass, 85%	51.14	51.06	51.08	53.95	25.000	24.750	24.250
Com. Bronze, 90%	52.63	52.57	53.17	55.19	25.875	25.625	25.125
Manganese Bronze	55.43	49.53	59.77	....	20.500	20.250	19.750
Muntz Metal	49.79	45.60	....	....	20.750	20.500	20.000
Naval Brass	51.69	46.00	58.75	55.10	20.500	20.250	19.750
Silicon Bronze	58.60	57.79	58.64	60.68e	27.375	27.125	26.375
Nickel Silver, 10%	64.06	66.39g	66.39	....	28.250	28.000	14.125
Phos. Bronze, A-5%	73.17	73.67	73.67	74.85	28.875	28.625	27.625

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

6.50; crankcases, 8.00-8.50; industrial castings, 8.00-8.50.

Copper and Brass: No. 1 heavy copper and wire, 23.50-24.00; No. 2 heavy copper and wire, 22.00-22.50; light copper, 20.00-20.50; No. 1 composition red brass, 20.00-20.50; No. 1 composition turnings, 19.00-19.50; yellow brass turnings, 12.00-12.25; new brass clippings, 18.50-19.00; light brass, 12.00-12.50; heavy yellow brass, 14.00-14.50; new brass rod ends, 16.50-17.00; auto radiators, unsweated, 15.00-15.50; cocks and faucets, 16.00-16.50; brass pipe, 16.50-17.00.

Lead: Heavy, 12.00-12.50; battery plates, 6.25-6.75; linotype and stereotype, 13.00-14.00; electrotype, 12.50-13.00; mixed babbitt, 12.00-13.50.

Monel: Clippings, 65.00-75.00; old sheets, 60.00-70.00; turnings, 50.00-60.00; rods, 65.00-75.00.

Nickel: Sheets and clips, 115.00-165.00; rolled anodes, 115.00-165.00; turnings, 100.00-140.00; rod ends, 115.00-165.00.

Zinc: Old zinc, 4.50-5.00; new die-cast scrap, 3.75-4.00; old die-cast scrap, 2.25-2.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 17.50-18.00; 3003 clippings, 17.50-18.00; 6151 clippings, 17.50-18.00; 5052 clippings, 17.50; 2014 clippings, 16.50-17.50; 2017 clippings, 16.50-17.50; 2024 clippings, 16.50-17.50; mixed clippings, 16.50-17.00; old sheets, 14.50-15.00; old cast, 14.50-15.00; clean old cable (free of steel), 17.00-17.50; borings and turnings, 15.00-16.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 54.00; light scrap, 49.00; turnings and borings, 34.00.

Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 25.00; light copper, 22.75; refinery brass (60% copper) per dry copper content, 24.50.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 25.00; light copper, 22.75; No. 1 composition borings, 22.50; No. 1 composition solids, 23.00; heavy yellow brass solids, 17.00; yellow brass turnings, 16.00; radiators, 17.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 50.29; oval, 49.42, 5000-10,000 lb; electrodeposited, 39.25, 2000-5000 lb lots; cast, 44.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab; less than 200 lb, 120.50; 200-499 lb, 119.00; 500-999 lb, 118.50; 1000 lb or more, 118.00.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb, in 100-lb drums.

Chromic Acid: 100 lb, 33.20; 500 lb, 32.70; 2000 lb, 32.05; 5000 lb, 31.75; 10,000 lb, 31.25, f.o.b. Detroit.

Copper Cyanide: 100-1000 lb, 77.50.

Copper Sulphate: 100 lb, 26.65; 200 lb, 23.65; 300 lb, 22.65; 400 lb, 22.15; 500 lb, 20.65; 2000 lb, 18.40; 6000 lb, 18.15; 12,000 lb, 17.90, f.o.b. shipping point.

Nickel Chloride: 100 lb, 48.50; 200 lb, 46.50; 300 lb, 45.50; 400 lb, 43.50; 5000 lb, 41.50; 10,000 lb, 40.50.

Nickel Sulphate: 100 lb, 40.50; 200 lb, 38.50; 300 lb, 37.50; 400 lb, 35.50; 5000 lb, 33.50; 20,000 lb, 33.00; 36,000 lb, 32.50.

Sodium Cyanide: 100 lb, 27.50; 200 lb, 25.80; 400 lb, 22.80; 1000 lb, 21.80, f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 79.50; 100-600 lb, 70.20; 700-1900 lb, 67.40; 2000-9900 lb, 65.60; 10,000 lb or more, 64.20.

Stannous Chloride (anhydrous): Less than 25 lb, 169.60; 25 lb, 134.60; 100 lb, 119.60; 400 lb, 117.10; 5200-19,600 lb, 104.90; 20,000 lb or more, 92.70.

Stannous Sulphate: Less than 50 lb, 132.20; 50 lb, 102.20; 100-1900 lb, 100.20; 2000 lb or more, 98.20.

Zinc Cyanide: Under 1000 lb, 55.55; 1000 lb and over, 53.55.

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(*Concluded from page* 153)

and in the Valley. Steelmaking and foundry grades are off about $2 a ton. Prices are largely nominal since buying is limited. Except for a purchase of No. 2 bundles by a northern Ohio mill at $34-$35, there was practically no buying last week. Auto lists are closing. Bidding on them will set the pace of the market. One list closed early last week at around $43 on track, about $6 a ton under last month's closing.

Chicago—Light demand and a declining steelmaking rate have combined to depress scrap prices by another $1 to $2 a ton. Those close to the market see no halt in the decline. The new price reductions center chiefly in the blast furnace and foundry grades and railroad material. Those grades have been holding.

New York — Slack demand and declining steel operations account for a further reduction in local scrap brokers' buying prices. Major open-hearth grades are holding at $45-$46; No. 2 heavy melting at $37-$38; and No. 2 bundles at $33-$35.

Cincinnati — The downward drift of scrap prices continues with new declines of $1 a ton on the principal steelmaking grades. No. 1 heavy melting is $43-$44, brokers' buying price.

Boston—Prime grades of heavy melting steel scrap are off another $3 a ton. Brokers are paying $40-$41, shipping point. Borings and turnings also are slightly easier.

Buffalo — Dealers anticipate a drop of at least $2 a ton in prices on mill grades of scrap when the local steel mills place April delivery orders.

St. Louis—Offerings of 6000 tons of railroad scrap by the Missouri Pacific and the Frisco railroads dropped an already weak market $2 to $6 a ton on those grades and a trifle less on other items.

Birmingham—The scrap market trend continued downward. Some consumers of cast are out of the market. Others have cut offering prices $1.50 to $3 a ton. Offerings on stove plate, for example, were down $3. The only movement of electric furnace grades is out of the district or for export.

No. 2 bundles are being sold for Pittsburgh delivery, and other points north.

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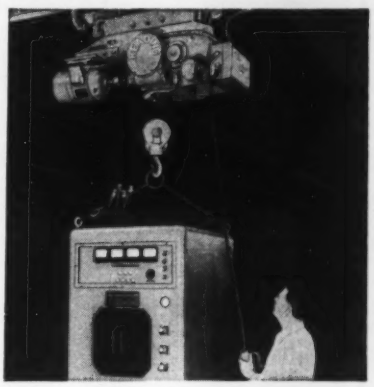

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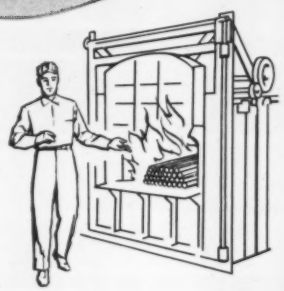

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Trailer truck and car illustrate the tremendous size of this great machine tool. Red key-arrows indicate two of five Farval systems. Whenever you see this sign of Farval you know a machine is being properly lubricated. Farval manually operated and automatic systems protect millions of industrial bearings.

THIS 615-ton milling machine, installed at Schenectady, machines steam-turbine-generator parts up to 18 feet wide and 16½ feet high to close tolerances.

Vital to its smooth operation are five manual Farval systems which lubricate the rail nuts on the cross rail. Two of them are visible in the photograph. With Farval, accurately measured amounts of oil or grease can be delivered to bearings whenever needed.

Five small Farval systems are an insignificant part of the cost of protecting the $1.5-million investment in this world's largest milling machine.

You, too, can protect your machines inexpensively with Farval. Why not investigate, then invest! Just ask for Bulletin 26-S. Our representative will call at your convenience. The Farval Corporation, 3270 East 80th Street, Cleveland 4, Ohio.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.

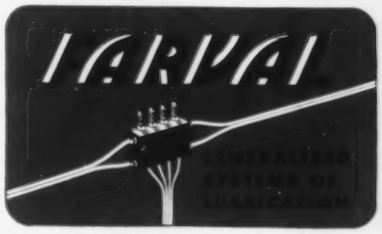

PLATE MILLS

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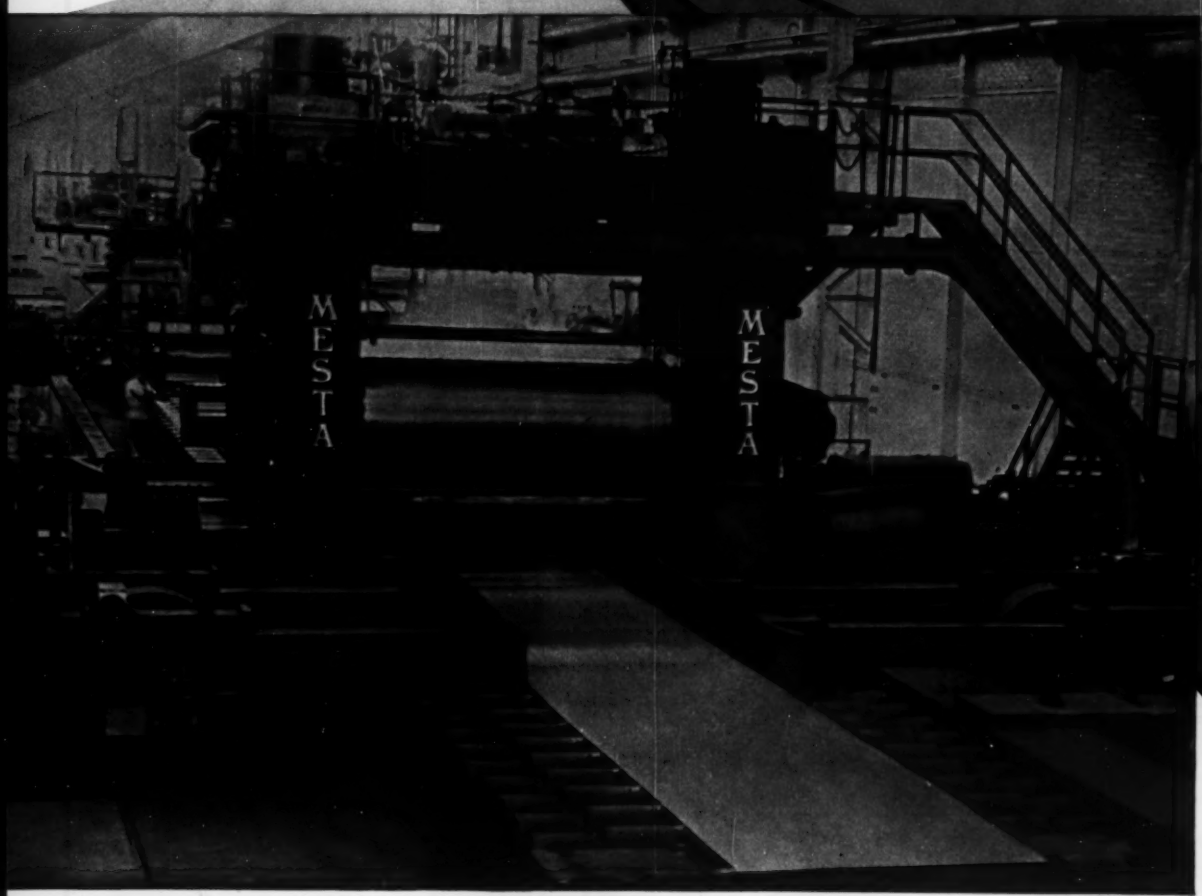

MESTA 132" FOUR-HIGH REVERSING PLATE MILL

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THERE IS NONE BETTER

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